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The Farmer's Digest

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The Farmer's Digest

Volume 5 September, 1941 Number 5

"Red Umbrella Selling"

Condensed from The Ayrshire Digest

Merton Moore

"You may raise hogs, oranges, potatoes, or kangaroos. But regardless of how well you do it, there comes a time when you must sell them. That is the period, please note, when most farm problems occur. Of course you wouldn't think to read the bulletins. They offer means and methods of combating rust, ticks, and coccidiosis; but, for some reason, the chapter on selling in most cases is totally absent."

THUS does Merton Moore, who has charge of the sale of purebred cattle developed by the Carnation Milk Company, write of the principles of salesmanship as applied to the selling of purebred dairy cattle in *Printers' Ink*.

In reviewing the successes and failures of those who have attempted to sell surplus livestock, he presents five steps in the salesmanship program which he has developed, all of which started with his initial attempts to sell his first bull, after accepting his position. The bull was a broken-tailed individual of unattractive type, but possessing a splendid pedigree. The prospect was a farmer named Albert, whom Moore had known in his county agent days. Here is the story as Moore tells it.

"Hastily, I grabbed a sheet of paper and a pencil and jotted down the details. I was afraid Albert wouldn't realize what a bargain this was; or would be too slow to act.

"And then my conscience smote me. What kind of a fellow was I to draw my pay from a company and then work for a man outside? I took what I had written to the boss.

"'Good! Just the thing,' he said. 'As good an ad as I've ever read. Too long of course, but a clincher just the same.'

"It was published—my letter to Albert—as an advertisement—cut down to a fourth its original length. The first line became the caption: 'Sometimes you can buy a really great bull cheap.'

Reprinted by permission from the Ayrshire Digest, Brandon, Vt., July 15, 1941

"It brought fifty-five inquiries. Five men wired us, and we could have sold the animal many times.

"So with the one idea in mind that I could tell folks what I thought about these cattle, I started writing letters. They were like my advertisements, and my advertisements were like my letters.

"I loved cattle. I knew them pretty well and I realized the need for just such animals as these. If the company had no objection to my taking advantage of what I knew and tipping off my friends, that's what I'd do.

"I sold bulls to Wisconsin, to Illinois, to Michigan. Presently I sold one to a man in New York. I'd never seen him and he's never seen me, yet he paid $1500 for the animal. As time passed I sold bulls to South America, Japan, New Zealand, Africa, Europe. But until I had sold over $1,000-000 worth of cattle, it seldom occurred to me that this was salesmanship. The tail-less bull could probably never have been sold in any of several local communities.

"In the first place there may have been no particular demand for a bull by anyone in that area at that time. But, spending a few dollars to take the message outside the neighborhood, uncovered fifty-five people who really wanted just such an animal. It's one thing to get your price among a few people who don't appreciate what you've got. It's quite another to get it from a group, all of whom want the animal badly.

"In the second place, whatever you have to sell, somebody, somewhere, needs it if you dramatize its value. You don't have to overstate. In fact, this leads to trouble and disappointment. But you must point out the value that is there so the other fellow can see it. You must have a picture for the buyer —either a photograph or words— and you must reach out beyond the few who live near you to the greater number beyond. There, waiting, is the man who wants what you have to sell.

"The first step in selling is to attract attention; but not in an immodest, unethical way. That usually scares the customer away before the second step can be applied. Step Two is to make the customer see quickly the value of the item you offer.

"To hypnotize a person into believing he wants something— only to have him discover later that he doesn't, does not cover Step Two as we, on the farm, must take it. We have just one place of business. We can't pick up and move.

"As to Step Two, the best method of describing value quickly is to appeal to the eye. When I was in County Agent work I spent a good deal of time with potatoes. We used good seed and sprayed the vines well. Then when digging time came we selected uniform, true-to-type potatoes and put

large quantities on display. We attracted buyers willing to pay a premium for our potatoes. We appealed to the eye.

"On this second point, however, I want to again return to cattle for a moment to indicate the importance of a good picture in selling. A cow with her ears back is just as good an animal as a cow with her ears forward; but you can't impress that fact on the buyer! A cow with her head down is as good as a cow with her head up—unless you are trying to sell her!

"I've learned it's cheaper, better and more satisfactory all around to sell by mail than to sell direct. You know the value of your cattle and I know the value of mine better than any outsider can ever know them. When a buyer comes to our farm to buy a bull I feel that the selection is his responsibility. But, if he writes me to pick one out for him, the responsibility is clearly mine.

"Selling by mail requires, first of all, a good photograph. It may be taken with an ordinary camera. This picture must not be retouched; but it must show, in the most appealing manner, what is to be sold. In the case of an animal, attention is attracted most by alertness, whether you are selling a dog or a bull. An alert cow has her head up, ears forward. If she is an animal of good type (and that is the point to emphasize) she should be posed to best show off her rump, her udder, her depth, her heart girth.

"Take her picture when she is most attractive; let us say, just before freshening. Let her stand so her topline is straight and parallel to the ground or the horizon. Don't take the picture until she is cleaned and brushed well, and don't use the manure spreader for a background.

"When she is posed properly, get her head up and ears forward. Make her say, 'What's that?' There's only one way to do it. Have some one, at least twenty-five yards away in hiding. When you are ready to snap the picture, let your assistant step out and open an umbrella—preferably a red one. As soon as she guesses what it is, the opportunity is over. You must keep her guessing!

"Step Three in selling is to reach the largest number of people who might be interested in what you have to offer. You can't afford to get the stage all set just for 'the folks around here.' You don't want twenty lukewarm prospects. You want, let us say, 10,000.

"A cousin of mine had some really marvelous dogs to sell. I helped him get good pictures, write an advertisement, and insert it in a paper with a large circulation among dog fanciers. He got over 300 inquiries, but he didn't sell a dog. Why? Because he neglected Step Four in selling:

he simply couldn't answer the inquiries. There were too many and they came too fast.

"He should have had an attractive piece of literature, a form letter, a picture, a pedigree (or whatever is necessary) to tell the story fully, clearly and promptly.

"Step Five is the 'follow-up.' This may be another letter with more details. It may be more pictures. It may be a special urge to buy. But, whatever it is, it should emphasize the value of the product in clear terms.

"Remember these 'Don'ts' in selling. First, set your price fairly and stay with it. Don't claim more than you can supply. Don't be careless or attempt to hurry a sale. Finally, don't leave a buyer who is ready to buy.

"Some one is sure to ask whether or not these selling principles apply to other things on the farm besides cattle, dogs, potatoes. The answer is 'Yes.' These are the principles of selling and they apply to everything from apricots to zebras."

Broody Hen Is Loafer

Broodiness, poultry research has proved, is an inherited character. Broody chickens tend to produce broody chickens, and there are relatively few broody hens in strains that for generations have been culled for broodiness.

"Broody hens," says Joseph P. Quinn, poultry research worker at the Beltsville Research Center, "spend too much on vacations from egg production, and should, therefore, be eliminated from the flock."

At Beltsville, the average production of non-broody White Leghorns was 194 eggs compared with 153 eggs for broody pullets of the same breed. In the Rhode Island Red flock non-broody hens averaged 205 eggs, but broody ones averaged only 180 eggs.

—N. J. Farm and Garden

How to Handle the "Four-Handed" Milker

Condensed from Successful Farming

Carlton Stoddard

THE fact that cows like to be milked with most new-type milkers is widely observed. Good hand-milking is an art—a tricky pull-and-squeeze that is sure to confound any city visitor who goes at it faucet-fashion. But milking machines nowadays go hand-milking one better. They have soft rubber inflations, or liners, in the teat cups that collapse under vacuum and massage the teat like the tongue of a hungry calf. This not only keeps up the blood circulation but provides a pleasing, gentle stimulation which causes most cows to give down their milk in a hurry.

Mechanical milkers of the past used basically the wrong technique, manufacturers say. The old contraptions that milked with mechanical fingers by pressure as one does by hand were wrong. So were the plain suction machines that left the teat circulation congested, and easy prey to udder infection.

The "inside" story of the udder's reaction to a modern machine is told authoritatively by C. W. Turner, of the University of Missouri. Years of research and dissection have probably given Turner as accurate a picture of udder anatomy as there is in the world. Suction draws milk only from the milk cistern, not the whole udder, he explains. The cistern just above the teats holds only a cupful or two and must be refilled from millions of tiny milk cells in the spongelike udder tissue. The milk cells are cased in sensitive muscles that involuntarily contract and squeeze out milk in response to the pleasing sensation of a good milking machine.

Rough hand-milking, or a disturbance in the barn, or painful teat cups upset the milk cart. A cow doesn't hold up her milk out of spite. She can't help herself. The milk muscles simply go on strike.

That's what happens when some machines creep up on the teat as the udder milks out. This tendency to "swallow" a part of the udder is dangerous, since it may pinch and bruise the sensitive udder tissue.

Most new-type teat cups are weighted or otherwise designed to prevent creeping up. The suspended milk-pail type uses the weight of accumulating milk to pull down on the teat. If the teat

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cups of your milker are too light, you can weight them down. Or you can "pump" the teat cups by hand during the last minute of milking—pull down on them rhythmically as the vacuum takes hold. Pulling down on the teat cups and manipulating each quarter of the udder is a good way to strip out milk that might otherwise be missed by the machine.

To strip or not to strip—that's the question among dairymen. T. E. Woodward, and R. R. Graves, of the USDA Bureau of Dairy Industry, found that a pound or two of milk left in the udder did not dry up a cow or affect the butterfat test. Rather, they said, it's a case of how much that extra pound of rich milk is worth to you.

Udder-manipulation pays in-increased milk yield, they conclude, but the machine should not be left on overtime to get the "last drop." Checking each quarter after removing the teat cups is definitely a hard and fast rule, however.

Most milking machines are *left on too long,* Iowa State College dairy husbandmen believe. Four minutes for easy milkers, six minutes for hard milkers should be the limit, they recommend.

For ten years I assisted in the operation of our old suction milker with plain metal, rubber-tipped teat cups that all too often fell off and served as a vacuum cleaner for the floor. All of the old-time milker troubles beset us. Udders were often swollen and inflamed with mastitis. Some cows had to be hobbled. Stripping took more time than operating the milker. Our milk was cleaned but not *clean,* for bacteria go thru a filter pad like ants thru a picket fence.

But our conception of machine milking has changed with the times. Today we are operating a modern milker under a simple but thoro system of sterilization, specifically planned to counteract udder infection and produce low-bacteria milk.

To head off any mastitis germs that wanted to go visiting, we adopted the Michigan State College plan of dipping the teat cups in chlorine solution after milking each cow. Either sodium hypochlorite or chloride of lime can be obtained at the drugstore and mixed with water according to directions. A cloth dipped in the same solution is used to wash and disinfect the udder before milking.

A good place to discard the used solution is right on the floor, where it wages a battle royal on lurking germs.

The second phase of the all-out sanitary program is the method of rinsing agreed on by nearly every milker manufacturer and college dairy husbandry authority. Immediately after milking the last cow, douse the teat cups up and down in cold water 10 to 12 times with the vacuum on.

Don't delay even five or ten minutes while you feed the calves, or the milk will have dried on like glue. Avoid hot water for the first rinse—it glazes and congeals the milk. Cold water is followed by a hot-water rinse containing washing powder, not soap. Soap leaves lather deposits inside the tubing and deteriorates the rubber. Scrubbing of all parts with a brush dislodges minute milk-fat particles that are as good as armorplate for protecting bacteria from sterilization. A final clear hot-water or chlorine-solution rinse assures germs of a starvation diet between milkings.

The third step is sterilization of the teat cups and milk hose. Sterilizing the teat cups can be done chemically, with heat, or with steam, but it should be done. The old immersion jar, in which rubber tubing was immersed, is giving way to the solution rack which holds teat cups upright. Lye or chlorine solutions in the immersion jar become contaminated and lose their strength, whereas the solution rack provides a fresh, unused supply of solution, with a convenient spigot for filling the teat cups from an overhead jar.

A lye solution keeps the rubber crisp, clean, and live. The University of Wisconsin recommends it over hot water or steam, which may cook, deaden, or even crack the rubber. The Wisconsin formula is to prepare a stock solution by gently dissolving a 13-ounce can of lye in an open earthenware jar. The stock solution should be stored in corked glass bottles. Dilute it, one part to twenty parts of water, for the solution rack. CAUTION: Label the stock solution "POISON" and store out of the children's reach. The diluted solution is harmless to the skin, but will corrode aluminum.

If your milker has an air pipeline, gargle it with lye solution immediately if you ever let a teat cup inflation crack open or a milker pail overflow so milk is drawn into the pipeline. A lye rinse once a week will rout out germs that breed in moisture condensed within the pipeline.

The important thing about these "four-handed" milkers is to see to it that they have clean hands.

How To Get the Most Out of Your Fertilizer Treatment

Condensed from Farm Research

Charles B. Sayre

JUDICIOUS use of fertilizer will greatly increase the yields and net returns of vegetables and field crops. Many farmers do not appreciate that the *method* of applying fertilizer is just as important as the kind and amount of fertilizer in determining the net returns. The effectiveness of the fertilizer can be greatly increased by improved methods of application. Also, some of the more effective methods of applying fertilizer save time and labor and therefore reduce costs of production. In particular the old method of broadcasting fertilizer and then discing it in requires more time and labor and is less effective than several other methods that will be discussed.

Some farmers broadcast fertilizer a few weeks in advance of planting the crop and disc the fertilizer thru the soil "to get it dissolved so it will be available to the crop." Commercial fertilizer is already in available form when it is applied and the aim should be to safeguard this availability and apply the fertilizer in the zone of active root growth where it will be most effective. Discing in fertilizer merely mixes it thoroughly in a shallow surface layer where the plant food becomes rapidly "fixed" in an unavailable form and where most of it is not accessible to the roots because of its position in the surface two inches of soil where it is too dry for the roots to thrive and where the roots are constantly cut off in cultivation.

No doubt many readers will immediately question the statement that when fertilizer is disced in most of it is merely mixed in the surface two inches of soil. A vegetable crops specialist in an adjoining state cites an experience that clearly illustrates how slightly surface applications are worked in. He was called to examine a soil on which the crops plainly showed symptoms of lime deficiency. He took a sample of the soil and tested its acidity and found the pH was only 3.7. The farmer laughed at that and said there must be something wrong

Reprinted by permission from Farm Research, Geneva, N. Y., July, 1941

with the testing kit because he had limed the soil that spring and that he had tested it and found a pH of 6.4. The professor acknowleged that something might be wrong because he had never found such an acid soil under cultivation, and suggested that they repeat the test with the farmer's kit. However, this also showed a pH of 3.7 and the farmer was dumbfounded, but decided there was something "phoney" about that soil sample; so he grabbed up a handful of soil and tested this and reported triumphantly a pH of 6.

Immediately the professor sensed the situation and inquired how the lime had been applied. The farmer said he had broadcast it an disced it in thoroly. "That explains everything," said the professor, "You can't get the lime deeper than two inches that way and when you took a soil sample for your test you merely grabbed a handful of surface soil which had received all the lime, while I took several cores of soil to a depth of six inches and mixed them thoroly for my sample. My test therefore gives a true index of the acidity of the soil in which the roots are trying to grow." The farmer scoffed and remarked that "Perhaps the professor had never seen a *good* job of discing in lime." The professor agreed and said he would like to see a good job of discing in anything. So they broadcast some lime heavily over a small area and the farmer got out his tractor and heavy disc and set it as deep as he could and drove back and forth over this area until he was satisfied he had demonstrated "a good job of discing in lime." They then took samples of soil at increasing depths in this area and again found that the lime had only been worked in to a depth of two inches. Below that the soil was as acid as ever. That convinced the farmer and he immediately put more lime on the entire field and *plowed* it under and now has a very productive field.

Plowing Under Fertilizer

Just as the broadcasted lime was only disced in to a depth of two inches so is disced-in fertilizer not effectively applied because most of the phosphorus and potash is "fixed" in an unavailable form in the dry surface soil. On the other hand, if the fertilizer is plowed under it will surely be in moist soil and in the active root zone. For two years, the New Jersey Experiment Station has been recommending that fertilizer be plowed under for tomatoes, and at the Indiana Experiment Station increased yields were obtained by plowing under fertilizer for corn. This method was tried at Geneva in 1940 in comparison with several other methods of fertilizing tomatoes. The results are given in Table 1.

TABLE 1—COMPARISON OF METHODS OF APPLYING FERTILIZER FOR TOMATOES AT GENEVA, N. Y., IN 1940

Treatment No.*	Method of Applying a 5-20-5 Fertilizer	Yield in Tons Per Acre To Aug. 31	Total Yield
1	200 lbs. in bands plus 400 lbs. plowed under	3.61	16.62
2	200 lbs. in bands 2½ in. to side, 4 in. deep	2.85	15.63
3	600 lbs. drilled deeply and not disturbed	2.64	15.48
4	600 lbs. plowed under	2.33	15.49
5	600 lbs. disced and harrowed in	2.11	13.88
6	14½ lbs. 11-32-14 (starter solution only)	1.66	11.45
7	No fertilizer	0.76	9.76

*Starter solution at the rate of ¼ pint per plant was used in the transplanting machine for all treatments except No. 7. A two-year-old sweetclover green manure crop was plowed under for the tomatoes which accounts for the good yield without any fertilizer.

The fertilizer was plowed under with a green manure crop of sweet clover about 3 weeks before the tomatoes were transplanted to the field. Unusually heavy rains occurred during this period and during the four weeks after the tomatoes were set in the field. Such conditions certainly favored deeper penetration of the fertilizer and shallower rooting of the crop, yet at no time was there any evidence of a lag in the growth of the tomatoes thus fertilized as compared with the other and shallower fertilizer treatments. It should be noted, however, that a "starter solution" was used in the transplanting machine. Apparently the starter solution nourished the plants adequately until the roots encountered the other fertilizer.

The "starter solution" consisted of 8 pounds of an 11-32-14 mixture per 50 gallons of water. The transplanting machine was adjusted to eject ¼ pint of this solution around the roots of each plant as it was set. The 11-32-14 mixture is composed of two parts of Ammo-Phos (11-48-0) to one part of nitrate of potash (13-0-44). Where the starter solution was used, the plants started to grow immediately, whereas without the starter solution the plants were checked in growth and were slow in getting established. At the rate of ¼ pint of solution per plant it required 91 gallons per acre, and this amount of solution contained 14½ pounds of the 11-32-14 transplanting mixture. While this amount was sufficient to start the plants growing quickly, it was, of course, not enough fertilizer to produce a large crop, as shown in No. 6, Table 1.

Band Placement

A very effective method of applying fertilizer is to drill it in deeply in the final preparation of the land *after* the discing and harrowing have been completed, No. 3 Table 1. About four inches is as deep as fertilizer can be applied with a drill, but at this

depth the fertilizer will be in the area of greatest root activity. If cultivating is properly done, the cultivator teeth will not dig in to fertilizer thus applied. In effect, then, the deeply drilled treatment consists of fertilizer applied in a series of parallel bands 7 inches apart and about 4 inches deep. This provides one of the advantages of band placement, namely, less rapid fixation, yet the large number of bands reduces the concentration per band so it is never injurious, but a plant root cannot extend more than 3½ inches to the side without encountering an available supply of fertilizer which insures quick growth. This is an especially effective method of applying large amounts of fertilizer and eliminates unequal growth of succeeding crops due to "row effect" of the previous year's fertilizer.

The largest early yields and total yields were obtained where a small amount (in this case 200 pounds per acre) of the fertilizer was applied in bands 2½ inches to each side of the row and 4 inches deep (Nos. 1 and 2, Table 1). This was done with an attachment to the transplanting machine that deposited the fertilizer at the same time the plants were set. Thus, no extra labor was required to apply the fertilizer except to fill the hoppers. The fertilizer attachments on most transplanting machines do not apply the fertilizer bands sufficiently deep. However, an ingenious farmer or blacksmith can remodel the fertilizer shoes so that the fertilizer bands will be deposited about 4 inches deep and about 2½ inches on each side of the row. It should be noted that one third as much fertilizer applied in bands (200 pounds) gave larger returns than 600 pounds of the same fertilizer applied by any other method except 200 pounds in bands plus 400 pounds plowed under. Obviously, the most economical gain was obtained from the 200 pounds of 5-20-5 fertilizer applied in bands (No. 2, Table 1), with an attachment to the transplanting machine.

Although a small amount of fertilizer in bands is very effective, it does not follow that a large amount would be more effective. Seven years experiments at Geneva have shown that 200 and 300 pounds of fertilizer applied in bands for tomatoes is very effective, but that if larger amounts are used it is best to apply the additional fertilizer either drilled deeply or plowed under (No. 1, Table 1). Larger amounts of fertilizer in bands are likely to cause "burning" from a temporary excessive concentration of soluble salts.

Seasonal Effects

The *Middle West Soil Improvement Committee* of the National Fertilizer Association advocates plowing under fertilizer as a more effective means of ferti-

lizing crops under drought conditions. This committee, composed of leading agronomists of the middle west, says that in dry seasons usual fertilizer practices are inadequate and that droughts of varying lengths are normal during the growing season in that region. They then state, "Recent investigations show that nitrate nitrogen migrates to the surface in prolonged drought periods to accumulate in the dry ¼ inch top of the soil. Any slight rainfall moves it back into the soil, but while it is on the dry surface it is out of reach of the roots.

"In other recent studies it has been found that corn was ineffectually obtaining nitrogen, phosphate, and potash where these were added in the row at the seed level and at the side of the seed. This placement helped the corn to get started in the moist periods of late May and early June, but when the soil was dry in July and August the phosphate and potash remained in the dry soil and the nitrates moved to the surface, causing most of the fertilizers to be out of reach of the roots which were growing deeper in the moist soil."

Altho the plowing under of fertilizer has been advocated in the midwest as a method of applying fertilizer that is particularly effective in drought periods, the results obtained at Geneva in 1940 when the rainfall was above normal indicate that it is also a very effective method in wet seasons (Table 1, treatment No. 4).

This year at Geneva the fertilizer experiments with tomatoes have been considerably expanded and include not only a comparison of fertilizers plowed under, drilled deeply, disced in, and applied in bands, but also include a comparison of several ratios of nitrogen, phosphorus, and potash and also the minor elements, and different rates of application. The results of these experiments will be followed with particular interest this year because of the marked contrast in seasonal conditions. Whereas last year the rainfall was considerably above average, especially in May and June, this season has been exactly the opposite, with a serious deficiency of rainfall. The combined results from these two contrasting seasons should be of great interest and value to growers seeking more effective means of applying fertilizers.

Out-of-Season Brooding

Condensed from Everybody's Poultry Magazine

Carl O. Dossin

RECORDS kept on forty poultry flocks in Pennsylvania for the year ending September 30, 1939, give a picture of conditions which exist on many farms. The houses were filled with birds on October first and by the first of April only 75 per cent of the original birds were left. July first, the plants were operating at sixty per cent efficiency because culling and mortality had already removed forty per cent of the birds. At the close of the year, only about forty-one per cent of the original birds remained. The removal of unprofitable birds from the flock accounted for 41.5 per cent of the flock reduction, and mortality, the other 17.5 per cent.

Interest and taxes have to be paid. Depreciation takes place on the plant and equipment, regardless of whether it is operating on a capacity basis or not. These figures also bring out that the owners had the lowest number of layers during the period of high egg prices. They also bring out that the heaviest culling was done on these farms from April first until October first, the period of declining prices for fowl.

Keep Plant at Capacity

It may be possible in time, through improved breeding, feeding, housing, and management methods, to keep a higher percentage of the flock in profitable production throughout the year. In the meantime, however, the successful poultryman must find some program for keeping his plant at near capacity throughout the year, marketing a good share of his large and medium eggs during the period of high prices, and selling off a fair percentage of his unprofitable birds during the season of good poultry meat prices.

Some poultrymen have solved this problem, at least temporarily, by resorting to out-of-season brooding, which most folks think of as brooding chicks other than during the period of March to May.

Some of the advantages set forth for this program are:

1. Laying houses kept at capacity.
2. More rigid culling permitted.
3. Pullet eggs produced when egg prices are low.
4. More even distribution of labor.
5. Lower investment.

Reprinted by permission from Everybody's Poultry Magazine, Hanover, Pa., June-July, 1941

6. Lessened disease problem.

There are some poultrymen who start chicks in January and another lot in May. The first brood will come into production early in the summer to help fill up the laying houses and the later lot will come in toward the end of the normal laying year. This program keeps the laying houses nearly at capacity and permits reasonably efficient use of brooder houses and range shelters. There are others, however, who find that a third lot started in the fall gives them greater plant efficiency.

Brooding Expenses Distributed

By keeping the plant at capacity through brooding several times during the year, the poultryman has a more uniform income throughout the year from the sale of eggs and meat. Then, too, this program distributes the brooding expenses so that they do not come during a period of a few months.

Most poultrymen know how to cull, but they are hesitant about removing doubtful birds from their flocks. If they know that they will soon require more room for pullets that are about to start laying, they will sell off these birds. If there is a lot of chicks started in the early fall, room in the laying quarters will be required for them during the late winter or early spring months. The problem of finding room for the pullets which will soon start to lay will force the poultryman to market all questionable birds. If this occurs during the period of January 1 to the middle of April, it means that the birds will be marketed during the season of the year when the highest prices are usually paid for fowl.

There are some who object to the fact that the pullets start to lay during the season of high egg production and low egg prices. This objection is not well founded, for during the period of low egg prices in the spring months, there is generally only about 5 to 8 cents a dozen difference between the price of pee wee and large eggs at the co-operative egg auctions in eastern Pennsylvania.

Chicks hatched during the commonly accepted normal brooding season will start to lay in the late summer or early fall months. At this season of the year, there is as much difference as 15 to 20 cents a dozen between peewee and large eggs. Pullets hatched during the fall or early winter months will lay their small eggs during the season of the year when there is little spread between them and large eggs and will lay their medium and largest eggs during the period of higher egg prices.

Better Use of Labor

The labor problem on all farms is becoming acute. Out-of-season brooding so distributes the labor requirements on the average poultry farm that the poultry-

man can employ his labor efficiently throughout the entire year. If all of the brooding is done during the spring months, there is an unbalanced demand for help at that season.

If the brooding equipment can be used several times during the year, the investment will be lessened. One Pennsylvania poultryman who has been brooding several times during the year for the past 12 years recently stated that he had $3,000 invested in brooding equipment, but he would have to add $6,000 to his brooding equipment if he were to keep his 9,000-bird plant at capacity by brooding only during the normal season.

Coccidiosis Less Severe

It is possible to have trouble from coccidiosis when doing out-of-season brooding, but usually the outbreaks are not severe. Disease organisms generally require both heat and moisture to thrive. The combination of these conditions usually does not exist in winter brooding.

There are several other points about out-of-season brooding that should be taken into consideration by those contemplating trying it.

1. Increased cost per pullet.
2. Increased broodiness.
3. More small eggs during warm weather.

Pullets started during the normal brooding season get larger as the weather improves, while with out-of-season brooding conditions are just the opposite. Because of the fact that the weather becomes more severe as these pullets grow, they will require more house room. This means that those who are the most successful in this program are starting about 250 chicks under a hover in the fall broods rather than 350 as in the normal season. It is best, of course, not to crowd at any time. Fewer chicks in a brood increase the housing, labor and fuel costs for each pullet raised. Then, too, pullets that can be range reared during the spring and summer months will consume large quantities of grasses which will lower mash intake.

There are some who like to start their fall chicks in September, but the cockerels from these broods are ready for market during the holiday season which is not the best broiler or fryer market. If started in early September, the pullets can be ranged for some time but this advantage is usually off-set by the lower price received for the cockerels. The males from the chicks started in October and November reach market size after the first of the year when the price on live poultry is generally higher.

Somewhat More Broodiness

It has been the experience of many folks who have tried out-of-season brooding that they have had a more serious broodiness problem with these birds. This is

true with Leghorns as well as those of the heavy breeds. One should not sell these birds for their first offense, but they should be banded and if they repeat, should then be sold.

Pullets that come into production in the early summer will usually lay small eggs for a longer period than those which start to lay in cold weather. Hot weather definitely affects egg size.

Another point that should be taken into consideration is the fact that pullets which start to lay in the early summer months and are confined to the laying houses at that time should have cool, well ventilated quarters if satisfactory results are to be obtained.

Shift Birds with Caution

When shifting birds to make room for the pullets coming into production, the poultryman must do it with great caution so as not upset production. If one will handle the birds carefully and maintain normal feed intake through the use of wet mash or pellets, this upset in production can often be avoided.

Out-of-season brooding has proven successful for most of those who have tried it, but there have been some who have not had satisfactory results. Many of the failures can be attributed to three causes: crowding, operating the brooder stoves too hot and for too long a period, and failure to get the birds roosting before heat is discontinued. Two hundred and fifty chicks to a hover, heat for about eight weeks, and roosts in the brooder houses at five to six weeks are recommended practices.

Mineral Hunger In Livestock

Condensed from The Fertilizer Review

ALTHOUGH the science of nutrition, because of the many findings on the subject which have been revealed in the past ten years, is often referred to as the newest of the sciences, there has long been a recognition of the relationship between the quality of the feed upon which livestock live and the quality of the cattle.

"The soil, climate, and mode of feeding and treatment so profoundly affect the size and quality of cattle, that it becomes impossible to raise them above what they can support." This statement was made in 1811 by William Aiton when he associated the kind of soil with the thrift of cattle in southwestern Scotland. Twenty years later Hogg wrote of an anemia called "pining" among sheep on the northern slopes of the Cheviot Hills on the Scottish border, saying: "There is only one effective cure known in this country, which is a change of pasture to one of more succulent herbage . . . if the sheep are laid on clover or limed ground the cure is quicker."

Chemical analysis of German pastures was suggested as early as 1873 for ascertaining what fertilizer should be applied in different districts to obtain high-quality hay. Sir John Orr in "Minerals in Pastures" emphasizes that there may be nutritional deficiencies in grass in many parts of the world which, though not so marked as to cause gross signs of disease, yet limit the rate of growth and of productivity; and may adversely affect the constitution of the animal, rendering it more susceptible to some diseases of bacterial origin.

Early foreign experiments established the general principle that the mineral composition of a mixed herbage is affected by fertilizer application. Roloff reported in 1869 that bone meal, if applied to a poor soil in Germany, would more than double the phosphorus and markedly increase the calcium content of hay. Researchers in France found an increase of 46 per cent in phosphorus content of grass hay where superphosphate was used, and an increase of 80 per cent from the use of superphosphate and potash. Superphosphate more than doubled the percentages of phosphorus and calcium of grass, clover, or weeds on depleted soils in Victoria, Australia. The percentage of clover plants in the pastures was increased five times by superphosphate.

Improvement in breeds has

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usually been associated with an improvement in pastures. Depleted pastures reflect lower quality stock. In the Falkland Islands sheep have been reared and exported for about 40 years without any return to the soil of the minerals removed. In the last twenty years it has become increasingly difficult to rear lambs there. Other animals are also deteriorating. Although deterioration in cattle due to impoverished soil upon which they feed is evident in Victoria, 360,000 tons of phosphoric acid have been removed in the last 60 years, and exported as meat, wool, and other animal products.

From the foregoing evidence it is plain that malnutrition due to over deficiency of minerals in pastures, is most likely to occur in old countries and on uncultivated pastures to which no return has been made to compensate for the produce taken out, or in new countries where the native stock has been graded up without a corresponding improvement in pastures. We now have both of these conditions in many parts of the United States.

About 25 years ago, phosphorus deficiency was observed in farm cattle in Wisconsin and Minnesota. The symptoms were stiffness of the joints, harshness of coat, dull eyes, unthrifty condition, and perverted appetite which resulted in bone chewing. The almost immediate recovery of severely affected animals by the use of phosphorus supplements or by feeding hay grown on better soil, stimulated much research in other areas.

In Michigan and elsewhere it has been shown that farm livestock may actually be suffering from lack of adequate mineral matter as measured by blood analysis, and yet show no external evidence of deficiency. Because of the apparently large number of borderline cases of mineral deficiency it becomes more important to make every effort to supply animals with adequate minerals.

Use of mineral supplements where needed, now takes care of farm animals which are fed grain, in addition to hay and pasture. But a great many animals which live mainly on pasture and naturally cured forage do not receive an adequate mineral supply.

The extent of this mineral deficiency in pasture land is revealed by research carried out in nearly every State. The area where phosphorus deficiency exists is now known to include nearly all of the northern Great Plains, the Gulf Coast, a part of the Atlantic Coast, the Middle South, and the extreme Southwest. Undoubtedly it would be observed more frequently in the eastern States if it were not for the fact that dairy animals especially are liberally fed on grain,

and that pastures have been improved by fertilizing directly and by fertilizing crops grown prior to seeding.

In 1930 a study was made in Florida of large numbers of range cattle on various types of poor pastures. Cows grazing on poor, flatwoods pasture produced only 34 per cent of a calf crop, with a gross annual return per cow of $10.33. Cattle ranging on more fertile hardwood hammock land produced a calf crop of 70 per cent, with a gross return per cow of $26.13.

At Beltsville, Maryland, nitrogen applied to Kentucky bluegrass increased the crude protein 12 per cent as an average of 56 comparisons with no nitrogen. The addition of phosphate and potash also resulted in increased crude protein content. When phosphate was applied there was an average increase of 25 per cent in the phosphorus content of the herbage and the calcium content was increased 16 per cent. The addition of phosphate to white clover produced a small increase of crude protein, an increase of 22 per cent in phosphorus, and of 12 per cent in calcium content.

At the Tennessee Experiment Station, increases up to 52 per cent in the phosphorus content of lespedeza hay were obtained from the use of superphosphate and potash.

Fertilized pasture plots at Hammond, Louisiana, produced 39 per cent more hay per acre, but because of increased phosphorus content, the fertilized grass contained 81 per cent more phosphorus than the unfertilized.

Phosphorus applications at Holly Springs, Mississippi, resulted in almost twice as many pounds per acre of pasture forage that was richer in crude protein by 20 per cent, and was grazed by the cattle in preference to unfertilized plots.

When mineral deficiencies occur on pasture land, they are reflected in generally identifiable symptoms in cattle. When calcium is lacking, the result is weakened bones, lowered milk production, and sometimes partial paralysis similar to milk fever symptoms, stiffened legs or swollen joints, and rickets in young animals. Symptoms of phosphorus deficiency in stock are depraved appetite resulting in bone chewing, poor growth and poor reproduction, weakened bones, rickets in young animals, loss of appetite for roughage.

Sodium and chlorine deficiencies result in marked salt hunger, loss of appetite, general break-down of the animal's system. Iodine deficiency is reflected in enlarged neck, or goitre in calves, colts, and lambs, and hairlessness in pigs. Symptoms of lack of iron and copper are poor blood and pale skin color, "salt sick" (emaciation), harsh and faded hair (of cattle, sheep, and

goats), difficult breathing (in pigs).

Cobalt deficiency may be reflected in restlessness, retarded glandular activity, loss of appetite, and other symptoms not clearly defined, but similar to iron and copper deficiencies in cattle, goats, and swine.

Manganese-deficiency symptoms are perosis or slipped tendons in poultry, poor hatchability in eggs, lameness in pigs. Magnesium-deficiency symptoms are irritability, lack of nerve control, poor appetite, convulsions in calves.

The reason these deficiencies are reflected in abnormalities and poor health is apparent when the work of each of the minerals is understood.

Calcium, an element which with phosphorus makes up over three-quarters of the mineral matter in the bodies of farm animals, over 90 per cent of that in their skeletons, and over half of that in milk, is of prime importance in growth, reproduction, milk production, and other body functions. Roughages grown on fertile soil, especially the legumes, are the chief sources of calcium for cattle, sheep, and horses. Hogs and poultry, not consuming much roughage, usually require additional calcium supplement. It may be furnished as calcium carbonate or with phosphorus when needed. The use of lime for growing legumes has been stressed so often that it is unnecessary to mention it further here.

In addition to its use in bone formation, phosphorus aids in the formation of protein and in changing sugars and starches into milk and body fat. A deficiency of phosphorus thus lowers feed utilization markedly. All forages, especially the non-legumes, and those grown on poor soils, as already pointed out, are relatively low in phosphorus.

The legume and oil seeds and some milling by-products are quite high in phosphorus. Therefore grain-fed animals rarely suffer from phosphorus deficiency, but animals that are fed lightly on grain and largely on hay, stover, and poor pasture are often deficient in phosphorus. Where fertilizers containing phosphorus are regularly used on field, hay, and pasture crops, the resulting feeds will usually contain sufficient phosphorus for the normal needs of farm animals.

Although sodium and chlorine are essential to animal life especially in maintaining osmotic pressure in the body cells, chlorine is also required in the formation of gastric juice for digestion. A complete break-down results if no salt is given for a long time. These two elements are easily supplied in the form of common salt at a rate of 1 per cent in the grain rations of cattle, horses, and sheep, with additional salt supplied. Hogs and

poultry usually benefit by the addition of one-half of 1 per cent of salt to the ration.

A small amount of iodine is essential for glandular activities in the body. Iodine deficiency is not usually encountered in luxurious pastures, nor where high-quality forage is provided. Deficiency in iodine exists in general from northern Ohio to Montana, but can be practically prevented by supplying iodized salt or potassium iodide to the rations.

Iron and copper are important in forming hemoglobin in the blood, and iron is essential in all body cells. Deficiencies of these two elements have been found in Florida and other Coastal Plain areas, in certain white and grey sandy soils, and on muck and peat soils not subject to overflow from fertile watersheds. Animals can be cured when given access to a mixture of 100 pounds of common salt, 25 pounds of red oxide of iron, 1 pound of finely ground copper sulphate, and 1 ounce of cobalt sulphate or chloride. Hogs, particularly suckling pigs in dry lot, may benefit from addition of iron in solution, or added as ferrous sulphate in their mineral mixture.

Manganese aids slightly in growth, reproduction, and lactation. Boron, potassium, magnesium, sulphur, and zinc have been proved necessary for crop production, but they are not deficient in ordinary rations fed to farm animals.

Ergot of Rye a Useful Drug

Condensed from The Farmer

ERGOT of Rye is one of the most widely used and useful of drugs. It occurs as a morbid growth in place of the grains of rye and derives its name from its resemblance to the spur of a cock, the word Ergot being adapted from the French. All of the grasses are susceptible to such morbid growths, but the Ergot from rye is at present the only Ergot which is officially recognized as of medicinal value.

Supplies of Ergot had, prior to the war, usually reached the United States from Europe where it had for centuries been separated from the grain at the time of harvest and sold for medicinal purposes.

Today with European trade disrupted and practically at a standstill, users of the drug are turning to our rye producing states where ample quantities are available, if only they can be saved.

As Ergot is in itself poisonous,

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its presence in the grain is objectionable and it must be removed before the grain is salable for consumption as a food. Previously the rye grower, grain dealer or miller removed the Ergot merely with the idea of improving the quality of his grain and giving little thought to value of the Ergot which was removed.

Two years ago an effort was made to acquaint the rye handlers with the value of this by-product and urge that it be saved—first, to enable the medicinal manufacturer to obtain in the United States what was formerly obtained from Europe and also because the careful saving of Ergot would provide a new source of income. During 1939 a total of nearly 100,000 pounds of Ergot was saved in the Northwest; and at current prices this meant something over $100,000 that was distributed to the savers for a previously unsaved and unwanted by-product.

How Fields Become Infected

Ergot which is not collected in the fields falls to the ground and in the spring absorbs moisture and sprouts, eventually throwing off spores which are carried by wind currents to fields of grain, there to infect the growing rye and so begin a new life cycle. Fields once infested will reinfest themselves although if the Ergot grains are removed from the grain heads before threshing it would in some measure eliminate the possibilities of the Ergot becoming a serious menace. Deep plowing also checks the spread of Ergot.

The normal needs of this country, as indicated by import figures, are something over 300,000 pounds per year; and it is hoped that sufficient interest can be stimulated to produce this quantity during the coming season.

Blackberries

As high as 6,000 quarts to the acre have been harvested from the Brainerd Blackberry, which has shown unusual promise at the Illinois Experiment Station. It is winter-hardy in the southern part of that state, but in Wisconsin, Minnesota, and similar regions, plants would need to be covered during the winter. Since it is a cross of Himalaya on an erect garden variety, the Brainerd has retained the trailing habit of the Himalaya and must be trellised. It is very spiny.

—*Successful Farming*

Limestone—A Fertilizer

Condensed from Capper's Farmer

Dr. William A. Albrecht

University of Missouri

MAKING liming pay better ought to have more attention now that we are using this soil treatment to feed calcium to plants rather than to fight soil acidity. This shift in purpose of liming points to possibilities in reducing the labor and financial load. Serving the single year needs of a crop for lime to make it better feed for livestock ought to be more encouraging than trying to remove completely a soil condition arising from many years of soil neglect.

Better feeding values in forages and healthier animals on soils treated with lime are recognized now that we have learned more about the services of calcium, or lime, to plants. In evaluating feeds as they supply proteins, carbohydrates, minerals, and vitamins one might not readily comprehend how calcium is connected with any of these items except, possibly, the minerals. But we know that calcium goes right along with nitrogen, the key item in protein. More nitrogen goes into plant protein only as more calcium is supplied by the soil. Then, too, phosphorus, which like nitrogen is also a part of the protein, is moved into the crop thru addition of lime to the soil. This helps us to understand how calcium makes protein, even if it doesn't come thru as a chemical part of this nutrient complex. Lime in legumes is the force that moves phosphorus from the soil and nitrogen from the air, so the plant can run not only its protein and mineral factories, but also can be a better factory for possible other complexes, such as vitamins, which make the big differences in the feed from limed soils when its full value is reflected in the animals that eat it.

We are so accustomed to thinking of legumes taking nitrogen from the air that we can scarcely imagine that they could fail in this process. Careful chemical studies show that unless they get lime liberally they don't use air nitrogen. Can you imagine that soybeans could grow to be almost two feet high without taking nitrogen from the air? Would you

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believe that even some of the nitrogen and minerals in the seed were lost back to the soil by this crop? Under such soil conditions the resulting legume forage crop has less minerals and less protein in it than was in the seed at planting time. This has happened on soil too low in lime. Only when liberal lime allotment was offered by the soil and taken by the crop were the minerals from the soil and the nitrogen from the air moved into the crop to make it a real feed in place of so much woody packing for the poor animal's paunch. Lime must get into the plant and serve there as a tool in fabricating the complex substances the plants make out of nitrogen, phosphorus and other plant nutrients.

Thus, legumes can be feeds, not merely because their pedigree labels them as such. Rather, they are nutritious according as they have calcium within their plant tissue to help carry out their plant functions, and not necessarily because the lime application has corrected soil acidity. Feeding plants lime makes it possible for them to feed the animals with forage of nutritious value.

Young plants must get lime early in their life. This was demonstrated in studies by Dr. H. F. Rhoades, now at the University of Nebraska. When soybeans were started ten days in limed sand and transplanted to soil, they grew much more successfully than those transplanted from unlimed sand. Young plants without lime often die and look as if they had been hit by a fungus to make them "damp off." Raising the delivery of calcium to the plant removed this "disease," so when plants are "taken" by fungous disease it may not be so much the epidemic as it is a lack of vigor.

Good feeding of the plants enables them to resist disease. Haven't we possibly been throwing seed away, complaining about the failure of plants to fight off disease; haven't we been purchasing disease-combating chemicals in place of recognizing this situation as indicating a fertility so low, first in lime, then in phosphorus and even other nutrients, that the soil delivery of those nutrients is too slow in the spring? In such cases the seed supply presumed to carry the plant into the warmer part of the growing season becomes exhausted before the soil delivery of nutrients is in higher gear. In place of taking up a fight against plant disease, perhaps we might well look to lime for help in "eliminating" weak plants by making them healthy and thus "immune" to disease, because they are well fed.

How shall we get lime or calcium into the plant and how much will it take? If all that we needed to use were that which gets into the crop, the figure would be less than 150 pounds of

limestone a ton of clover hay produced, or less than two-thirds of this figure for a ton of soybean hay. We still can't get the lime into the plants by external application. It must come thru the roots and they must take it from the soil. Delivery to the plant by this soil route is far more effective when a little of the soil is heavily loaded with lime, than if all of the surface soil has the limestone thinly scattered thru it. Non-legumes such as bluegrass and redtop, as well as legumes, get their lime or calcium much more effectively if the upper 2 inches of soil are heavily dosed than if this same amount of limestone is mixed into the soil to a depth 4 times as great. Soil that has become sour has a tremendous power to hold lime. Plants can't take from it all the calcium it has. Studies to date give a low efficiency in lime recovery by plants unless the lime is used so as to saturate the soil in the root-feeding zone. We are then forced to think of the practice that loads a little of the soil completely rather than all of the soil only partially, if the investment in limestone is to give us maximum return.

Studies of the practice of drilling limestone as a fertilizer have demonstrated that as little as 600 pounds on a soil needing more than 2 tons to sweeten it can establish sweet clover regularly in a rotation, tho more limestone is better. The stand of sweet clover from drilled limestone holds out against winter-killing when that sown without limestone fails. The composition of the crop in terms of forage feed, and its effects as a soil-improver on the corn crop following, are all evidence that giving the crop its calcium without neutralizing the acidity is coming to be the real function of liming, and that economical and effective use of limestone means that it may well become a fertilizer in our thinking and in its use.

The art of liming is old. The science of it is new. Our science has led us astray and we are just now getting back. Nature always has been consistent in demonstrating the effects on plants by liming, but we have not been so consistent in explaining how these effects came about. We have looked to the wrong one of two things going on at the same time, as the real cause. When we use limestone we put on calcium combined as a carbonate. The carbonate neutralizes the soil acid. We have misconstrued this phenomenon as the cause of plant improvement when we should have been thinking of the addition of the calcium to the soil as the causative factor. Since sodium carbonate which removes the acid doesn't help the plants, while calcium chloride helps the plants but doesn't correct the acidity, we know now that liming is not a matter of fighting soil acidity but one of giving the plants calcium,

their much-needed nutrient on our humid soils.

Thus, we can put liming into the fertilizer category and look to lesser applications per acre to serve its fertilizing function. But we must remember that nature has been taking the lime out of our soils for many years and a teaspoon dosage now won't do the work completely. We need to give many of our soils a heavy liming to offset this neglect and then we can go to regular lighter applications of 1,000 pounds an acre by drill in place of tons by spreader. As we go to using lime to feed plants so they can feed and protect our animals against starvation fevers, we see prospects of making this operation economical enough in money and labor costs so we will adopt it for use as regularly as we scatter a legume seeding.

Salt a Cure for Cannibalism

SALT is a cure for chicken cannibalism; James Halpin, University of Wisconsin poultry expert, has found. Not a new unheard-of salt; just plain table salt.

Halpin has concluded from his experiments that the cause of picking is not the condition of the feathers or skin of the chickens picked, or of the bloodthirstiness of the pickers. It is rather a simple dietary deficiency—a deficiency easily remedied by salt.

There are two ways of making use of this new discovery: The salt can be put in the mash or in the water. When it is put in the mash, about one-half pound of salt to each 100 pounds of total feed is enough. However, when the flock is getting twice as much grain as mash, as is often the case with pullets, this should be increased to *two* pounds of salt.

The easiest way of using the treatment, and the one which should be used when the picking is first noticed, is to put salt in the drinking water. This should be done as follows: Using more water than the chickens will drink in four or five hours, add *one* tablespoonful of salt per gallon and give it to the chickens for a half a day as their only drinking water.

Then dump it out and refill the dishes with fresh water free from salt. This saltwater treatment should be repeated in three to four days. If this does not work, then salt should be added to the mash, too.

Naturally the salt acts as a laxative, and if used too generously or too often, results in a weakened condition and loss of energy to combat the "pickers."

—*Successful Farming*

Influence of Early and Late Calving on Production of Dairy Heifers

Condensed from New Jersey Farm and Garden

R. P. Reece

A question that is constantly confronting the dairy farmer is "At what age is it most advantageous to have dairy heifers calve?" Will the dairy heifer produce more milk if she calves at a later stage and, if so, is this increase in production sufficient to offset the added cost of raising the heifer to a productive state? Furthermore, since the dairy heifer reaches sexual maturity at an early age, the time of calving is a factor that should not be controlled by the age at which the heifer reaches sexual maturity, but by the dairyman. It is known that under extreme conditions when the ration is deficient in some essential food substance the first appearance of heat is delayed from three to six months. The effect of heavy feeding is to advance the age of sexual maturity, and trials conducted at the Missouri Agricultural Experiment Station show that heavy-fed Holsteins reached sexual maturity at an average age of 261 days, while the light-fed group averaged 373 days. The heavy-fed Jerseys were sexually mature, on an average, seventy-six days earlier than the light-fed Jerseys.

Of course age in itself is not the main factor that determines when it is most advantageous to have heifers calve, but only inasmuch as age is the primary factor controlling the size of the heifer. Each dairy heifer is a problem in itself and a heifer that has made rapid growth can be bred at an earlier age than one that has grown more slowly.

Eckles was one of the first to have made a study of the influence of early and late calving on the production of dairy heifers. The early calving group, consisting of six Jerseys and two Holsteins, was bred to calve at twenty to twenty-four months of age and the late calving group, consisting of four Jerseys and five Holsteins, was bred to calve at thirty to thirty-four months of age. Slightly more milk and fat were produced by the late calving group. In summarizing the records of seventy Jerseys and twen-

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ty-five Holsteins in the dairy herd owned by the University of Missouri, Eckles found that with both Jerseys and Holsteins the highest producers were those well matured at first calving. The Jerseys calving under twenty months averaged 207 pounds of fat for the first three lactations; those calving at the age of twenty-four to thirty months averaged 260 pounds; and those between twenty-eight and thirty-two months, 328 pounds. The Holsteins calving under twenty-four months averaged 225 pounds of fat for the first three lactation periods; those calving at twenty-four to thirty months averaged 307 pounds; and those calving at thirty to thirty-six months, 266 pounds. He concluded that from the standpoint of securing the greatest development as a dairy animal it is a decided disadvantage for a Jersey cow to calve under twenty-four months of age, while nothing seems to be gained by allowing her to reach an age of more than thirty months. Also, that it would appear that the best Holstein milk producers are on the average found among those which are well matured before coming into milk for the first time.

Beam in studying the records at the Pennsylvania Station found that heifers calving between the ages of eighteen and twenty-four months produced, on the average, 261 pounds of fat, while those calving, for the first time also, between the ages of thirty and thirty-six months produced 278 pounds of fat, a difference of only seventeen pounds of fat.

Turner, of the Missouri Station, has secured some very interesting data in the study of the Advanced Registry and Register of Merit records of Ayrshires, Guernseys, Holsteins and Jerseys. His data are of particular significance since they are based on a large number of animals. He has shown that the largest number of Jerseys calve during the twenty-fourth to the twenty-sixth months, the Guernseys during the twenty-sixth month, the Holsteins during the twenty-sixth month and the Ayrshires during the thirtieth month.

Turner's data show that little is to be gained in the way of increased milk and fat production by delaying the first calving of Ayrshire cattle beyond thirty months of age. The study does show an average increase of approximately fifty pounds of butterfat and 1,200 pounds of milk by delaying the calving from twenty-four to thirty months of age. However, with each month's advance in age to thirty months, the benefit of further delay rapidly decreases. Neverthless, forty-three per cent of the Ayrshire heifers freshened after thirty months of age.

With Guernseys, milk production increases rapidly by delaying calving up to thirty months,

after which the increase is negligible. Yet twenty-eight per cent of the Guernseys calved between thirty and thirty-six months of age.

Holsteins show an average yearly increase of forty-five pounds of fat and about 1,400 pounds of milk by delaying the calving from twenty-four to thirty months, and it would appear that no material increase in the production of Holsteins is gained by delaying calving beyond thirty months. However, thirty-five per cent of the Holsteins calved between the ages of thirty and thirty-six months.

In Jerseys, as the age of calving increases, the average production rises gradually. In comparison with the other breeds this rise is less rapid and also less in total amount. By delaying the calving from twenty-four to thirty months the average increase in production was less than twenty-five pounds of fat and 400 pounds of milk. It certainly would not be advantageous to delay calving beyond thirty months, yet twenty-three per cent of the Jerseys calved between thirty and thirty-six months of age.

If dairymen desire maximum production at the expense of economic production they will find it desirable to delay calving until about thirty months of age. However, if dairymen are primarily interested in economical production they may find it a sound practice to breed their heifers to calve from twenty to twenty-four months of age. They will sacrifice varying amounts of milk and fat but the production will be most efficient.

From a breeding efficiency standpoint it may be more advantageous to not delay calving to thirty months. If the ovaries of a heifer are functioning normally, after every time she comes in heat a follicle ruptures and a corpus luteum or "yellow body" forms in the ovary. The longer that breeding is delayed the greater is the number of corpora lutea which forms. Hammond believes that the increased formation of connective tissue in the ovaries of the cow is "largely derived from the central plug and surrounding connective tissue of successive corpora lutea." It seems entirely possible that if an excess of connective tissue forms in the ovaries this may interfere with the normal functioning of the ovaries.

Coolers Boost Egg Income

Condensed from Electricity on the Farm

W. C. Krueger

Agricultural Engineer, New Jersey State College

A rural banker and a county agent are showing Jersey poultry farmers how to boost egg income 60 to 90 cents a case. They are doing it with a simple egg cooler made of an electric fan blowing air through a trickle of running water.

It all started when William J. Kinnamon, Cashier of the Hunterdon County National Bank and Chairman of the Agricultural Committee of the New Jersey Bankers' Association, asked County Agent Dwight M. Babbitt for suggestions for closer banker-farmer co-operation. Babbitt knew that many poultrymen were selling eggs at two to three cents per dozen under the price of U. S. Extras, and that cooling and holding conditions were largely responsible. So why not a demonstration of recommended equipment and practice? Kinnamon welcomed the idea. As a result, the bank financed the construction of three egg coolers designed by County and Agricultural College Extension men to meet local requirements.

Dimensions of Cooler Unit

The cooler consists of a box 20 inches wide, 16 inches high, and 4 feet 8 inches long, closed at one end and with three 12½ inch beveled round holes cut in the top board. A cross member under each hole supports a wire egg gathering basket so it projects about ⅓ above the box top. The fan unit is mounted in a box of the same cross-section and 1 foot 9 inches long. The fan is an ordinary 8 inch room type ventilating fan. A hole is cut in the air tight end partition just large enough to admit the fan blades. This tight partition and close fitting fan is necessary to draw air through the evaporator section, which is 3 inches thick, enclosed on both sides with hardware cloth and loosely filled with excelsior. A ½ inch copper pipe perforated with eighteen 1/32 inch holes along the top is laid across the open top of the excelsior unit and is supplied with water through a stop cock adjusted to a slow drip. The evaporation from this wet excelsior cools and humidifies the

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box. The three parts may be held together with hooks or can be built as one unit. Close fitting lids should be supplied for two of the box openings for closure when only one container of eggs is being cooled.

Three poultrymen gave the coolers a try. All fell just a bit short of regularly making the U. S. Extra grade and that extra two to three cents a dozen.

Two of the units were placed on the Louis Diemert farm at Pittstown and the Earl Hartpence farm at Pleasant Run in rooms partitioned off from their basements. The enclosed rooms helped to maintain uniform temperature and humidity conditions for the packed egg cases. The third unit on the Howard Larason farm near Delaware, was built as part of a cabinet which also enclosed the water supply pressure tank, used for additional cooling effect, and ten egg cases.

Cost of each of the two coolers and their enclosing storage rooms approximated $45.00. The Larason cabinet cooler, with angle iron slides for two baskets and ten cases also cost about $45.00.

Earl Hartpence reports an average of 90 cents a case increase as a result of higher grade classification at the egg auction due to better cooling and holding practice. This in spite of the fact that, "I always used to cool the eggs and store them in an earth floored cellar apart from any heater—conditions which we poultrymen considered ideal."

Louis Diemert formerly kept his eggs in the cellar in a corner of the furnace room but winter conditions were too dry and warm and in the summer the light airy cellar was not cool enough. His 1400 birds at 50 per cent average production have been netting about $8.00 a week extra as a result of his improved cooling.

Howard Larason and his son, Erville, report an increase of $39.40 between August 26 and December 30 in their egg returns based on previous grade price levels. Eight to ten kilowatt-hours is the maximum that the ventilating fan uses per month. The Larason experience is particularly interesting because the eggs had been gathered in wire baskets, had been placed for cooling on a concrete basement floor practically over an open spring flowing clear cold water the year round. "I realize now," Mr. Larason admits, "that floor temperatures at best are not uniform and that packing the cooled eggs into relatively warm and bone dry containers is not the best practice." That little item of pre-cooling and humidifying the empty cases before packing looks pretty important in view of results.

Prof. F. P. Jeffrey, at the New Jersey College of Agriculture Poultry Department, emphasizes that you cannot improve eggs but

that a lot can be done to *keep* them good. Retaining this original quality, he says, calls for cooling within a few hours to 50° or 60°F., with a maintained relative humidity of 75 to 80 per cent during the storage period. He found a deterioration of 30 per cent in two days when held at 80° but only 8 per cent in fourteen days at 45°. The high relative humidity slows evaporation, keeps the air cells small and prevents the mottling so characteristic of dry storage conditions.

A New Legume—Lotus Corniculatus

Condensed from Pacific Rural Press

D. M. Rutherford

CHARLIE Hoover, of Medford, Oregon, is interested in the production of Lotus corniculatus, a forage crop of the family commonly known as bird's foot trefoil, somewhat resembling vetch, growing in long, slender shoots which lie on the ground in a mat if not supported. Foliage is very fine and lacy. The pea-like flowers are yellow.

Strangely enough, this perennial legume is one of the oldest known plants, yet has only lately been considered as stock feed. How it came to the Medford area is unknown. It is mentioned in Biblical literature, yet only in the last couple of years has it begun to find a place in commercial farming. A local weed made respectable, as it were. Hoover is so much interested in lotus that he and his partner, Dr. H. P. Poston, have planted a large acreage, much of it on abandoned farm land which has been bought from the county.

We visited the Hoover properties near Medford recently and were shown lotus, southern Oregon type, growing under a variety of conditions. It looks very promising. We do not intend to go off the deep end in this article and must point out that the limitations of the plant have not been established as yet, but we will tell what we saw and learned as a sort of progress report.

We found it growing in a creek bottom among tules. It was doing well in a number of irrigated fields as a companion plant with Ladino clover. We saw it thriving on hillsides where irrigation was impossible and soil not the best, and doing very nicely, it

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seemed, in the dense shade of an abandoned apple orchard. We have reports from disinterested sources indicating that lotus is relatively tolerant to alkali and does well under marsh conditions. Agronomists and extension agents who have been watching the plant for some little time report that it is very promising and that it will grow where many other forage crops will not exist, but they point out that there is still much to learn about the plant.

In producing lotus Mr. Hoover says he has found it is desirable to use superphosphate and land plaster on poor land. The seed must be inoculated at the time of planting—not before. Seed for planting must be scarified; otherwise there will be poor germination. Hoover says that the yield is best when fields are well drained. He uses contour furrows. His practice is to flood the fields quickly with a good head of water and then allow it to drain off. Frequent irrigations produce the best yields.

Lotus has a crown somewhat like alfalfa and old plants may produce as many as a hundred shoots growing from a single crown. When it is cut or grazed, new shoots start from the crown to replace those removed. The plant has an extensive, fibrous root system which averages about two feet or more in soil penetration. Plants which we pulled had roots at least two feet in length.

The chemical analysis of lotus hay indicates that it is on a par with alfalfa:

	Percent	
	Lotus	Alfalfa
Protein	14.24	14.70
Fat	2.90	2.00
Fiber	29.60	29.00
Calcium	1.10	1.43
Phosphorus	.28	.25

Cattle feeding on green fields of lotus are not subject to bloat. The plant is not laxative. It is consumed readily by sheep, hogs and cattle, but is not to be praised as a feed for horses. Lotus is not advocated as a substitute for alfalfa, but where alfalfa does not do well, and in more rugged conditions where alfalfa is not a feasible crop, lotus apparently has a place. It has all the characteristics of a tough weed, along with excellent feed value. It can be controlled by plowing under, as is the case with alfalfa.

We saw lotus growing along roadsides in active competition with weeds. Apparently it is able to hold its own under adverse conditions. Hoover thinks that if burned-over range land is seeded to lotus, it will be helpful in checking the growth of ferns as well as providing feed and protection against erosion. Winter bluegrass, crested wheat grass, and rye grass seem to work well in combination with lotus. For hay purposes such a supporting crop is desirable; otherwise, the lotus will become matted.

When lotus is treated with a

certain amount of respect by way of fertilization, adequate irrigation and drainage, it produces yields comparable to good fields of alfalfa. However, on Oregon ranges it will survive in competition with any other plant found in the region. It has been difficult to find a good legume for mountainous range conditions, and for this purpose lotus shows promise. A combination of winter bluegrass, Ladino clover, and lotus makes a good year-round supply of pasture feed. Planting of lotus in low-yielding meadows has brought up their stock-carrying capacity materially.

Back in 1923 Hoover hired a plane to plant grass seed on some range land he controlled, most of the seed being planted along the ridges. He noted that during the first year the grass seed worked down the hills fully a mile. Now, having established a large acreage of lotus upon which seed harvest is possible, he plans to sow lotus seed from an airplane over some of the more mountainous areas in his section to see what will happen next.

As we have said before, we do not yet know the limitations of lotus. It looks good. When a local farmer takes a wild plant which he has observed to be hardy and well liked by cattle, and plants it in large acreage commercially, it is interesting, to say the least.

New Erysipelas Vaccine

A huge field experiment indicates that swine erysipelas can be prevented by simultaneous injection of protective serum and a live culture of the germ. This is followed in 14 days by a double dose of the culture.

Almost unknown 10 years ago, erysipelas has been reported in more than 40 states. Worst feature of the disease is that the caustive germ will live and thrive in the soil of lots and pastures. This means a perennial menace and a special hazard to baby pigs.

On farms where the disease is known to exist, vaccination of pigs as young as a week old is advocated. Sows should be vaccinated annually if held over. No adverse reactions other than stiffness have been reported following injection of the erysipelas serum and culture, even on pigs a few days old. At rare intervals cases of "serum shock" may be seen, but this is usually not fatal.

Common symptoms of erysipelas are diarrhea, prostration; stiffness; lameness; big joints, eyes free from exudate; fast shrink; high fever; and, very often, a peculiar red discoloration of the ears, inner surface of the legs, and belly. The disease resembles hog cholera so closely that a laboratory examination is often necessary to tell them apart.

—*Successful Farming*

Almost 100 Per Cent

Condensed from Southern Agriculturist

Ross L. Holman

RECENTLY some one told me that Reams Fleming produced on his own farm near Franklin, Tennessee, 98 per cent of the food his family consumes. I went down there with the feeling that if only 25 per cent of this statement were untrue I would still have a good story. Some one else told me that you could throw a blockade around the Fleming farm, shut out all food and shut in the family, and every one of them would die of old age.

When I got there I found that Fleming probably doesn't import more than two per cent of his food but he exports a lot.

Among other things I learned that Mrs. Fleming put up 1,500 cans of fruits, vegetables, meats, corn, etc. Her family commissary has shelf upon shelf of canned apples, peaches, plums, cherries, beans, tomatoes, fruit and vegetable juices, preserves, pickles, chow-chows and marmalades.

She processes her garden and orchard products in two ways. She throws some of them into her rented locker and turns on the zero temperature.

I started looking around and what I didn't see Mr. Fleming showed me. A strawberry bed as clean as a hound's tooth. A neat looking grape arbor that is loaded during season. Orchards of apple trees, peaches, plums, cherries, pears, and almost everything that goes by the name of fruit.

His garden works the year 'round. Late summer and fall crops, abundance of turnip greens during winter, with asparagus shooting up the first crack of spring.

In his back yard are eighteen colonies of bees that provide a year's supply of honey and sometimes $200 worth or more to sell. His poultry houses hold 200 Leghorns that average 50 per cent production the year around. Besides what the family consumes, $30 to $40 worth of poultry products per month go on the market.

In his dairy barn are 26 head of cows and his cream output is one of his chief money crops. Out on the winter pasture of wheat and barley 31 sheep and 26 lambs are grazing. He does not raise hogs for the market but produces every bite of hog meat the family consumes.

Flour is secured from his own wheat that he deposits in the mill for grinding. He grows varying

Reprinted by permission from the Southern Agriculturist, Nashville, Tenn., July, 1941

amounts and has some to sell. The corn bread originates in his own cornfield.

In addition to dairy and poultry products his money crops consist of six to ten acres of tobacco, some lambs, wool, honey, surplus fruits and vegetables, hybrid seed corn and oats. He produces these different commodities with his own labor, one other hand, a tractor, tractor cultivator, a milking machine and REA electricity. He also deals in antique furniture.

The Flemings have to rent two lockers to handle all the food they want to process by freezing. The lockers cost $10 to $12 a year each. When the strawberries get ripe some are canned and preserved; the others are placed in the cooler and frozen. Cull hens and broilers are dressed and lockered. Mr. Fleming finds room in those lockers also for dressed lambs, peaches, hogs and butterbeans.

Mr. and Mrs. Fleming recently won the Williamson County award for the best record on the Tennessee Home Food Supply program. This program, initiated two years ago by Commissioner of Agriculture C. C. Flanery, has swept the state like wildfire. Over 50,000 of Tennessee's 275,000 farmers are enrolled. Each county has a committee to make the awards for the best live-at-home records for those enrolled.

Although home grown livestock feed is not included in the Home Food Supply program, Mr. Fleming's farm production record in this respect is almost as unanimous as that which involves his family. Every bite of feed that he translates into milk and butterfat is grown on his acres. It consists of a balanced roughage in the form of silage and lespedeza and alfalfa hay. He crushes corn and cob meal with his own crusher powered by his own tractor. This year he will grow his own protein grain mixture in the form of soys and other beans.

Practically every plowable acre is covered with winter grazing in the form of wheat, barley and oats. The farm has much permanent blue grass pasture.

Pullets Pay Big Rent For Cropland

Condensed from Farm Journal and Farmer's Wife

HAVE you an acre of cropland you want to rent for $226 a year? You may get that much for it if you will put it in clover or alfalfa and use it for pullets in place of the old chicken yard where growing birds mingle with old hens.

Unlike many a good idea, this one is based on facts and figures. That amount is what pullets actually paid for the use of clean isolated range under practical farm conditions during five years of poultry investigation at the Ohio Experiment Station.

A table printed in connection with this article gives the actual results. This table should enable a farmer to make up his mind whether to take the large potential return from 200 high-quality, ready-to-lay pullets per acre, or his usual returns per acre from clover or alfalfa hay.

Given in the table are actual results from different groups of pullet layers. Some of these pullet layers were isolated from older disease-carrying birds while they were chicks and growing pullets. Some of them were not. All groups were hatched from eggs which came from the same breeding flock, and all were fed the same ration. All eggs were hatched from the same incubator at the same time.

There was, however, one vital difference in management between the time the chicks left the incubator and until the pullets started to lay. That difference was whether or not the chicks and growing pullets were isolated from older birds. It was this difference which accounted for a difference in egg production and livability of the pullets when they were in the laying house.

The pullets which were raised in isolation from the diseases and parasites of older birds during the five years laid 57% more eggs than the ones which were not isolated (this figure is based on an average of five years' results). These isolated pullet layers also averaged 32% lower mortality than the others which were not isolated. The loss of pullets as layers in the isolated clover pasture group was only 24%, whereas it was 56% in the other group of pullets.

In terms of egg records, the isolated pullets laid 41 eggs more per bird than non-isolated ones. The isolated pullets returned $1.13 more per bird than the non-isolated ones. Since this work was carried on under practical

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farm conditions, there is no reason why the farm flock-owner should not expect similar results.

An acre of clover or alfalfa will serve 200 pullets. Thus, you see, returns per acre are a matter of considerable money—$226, to be exact. Is there a more profitable and effective way to prevent the tremendous losses of pullet layers and losses of egg production due to diseases and parasites?

A question that flock-owners frequently ask is this: can a range well isolated from older birds and used exclusively for growing pullets be safely used each year provided it is free of chickens from October to April? At the Ohio station this kind of range has been used year after year. Nevertheless, pullets raised on this range proved inferior (in laying and livability) to pullets raised on distant farms entirely away from the experiment station poultry grounds, where the range had complete isolation in so far as direct contact with older birds is concerned.

This would indicate that the use of a range year after year may permit a build-up and carry-over of diseases and parasites. To put it another way, it seems as if isolation for growth of healthy, ready-to-lay pullets demands growing the chicks and pullets not only away from older birds, but on soil and premises free from disease and parasite contamination.

In getting information on this particular point, about half of the station's 2,000 pullets were raised last year on a clover field adjoin-

HOW POULTRY PROFITS ARE AFFECTED BY ISOLATION OF CHICKS AND PULLETS

	ISOLATED PULLETS			NON-ISOLATED PULLETS		
Year	Eggs Per Bird	Loss of Pullet Layers	Returns Per Bird Over Cost of Feed and Loss of Pullets	Eggs Per Bird	Loss of Pullet Layers	Returns Per Bird Over Cost of Feed and Loss of Pullets
1930-31	150	26%	$1.50	86	66%	$.34
1935-36	182	23%	2.14	119	62%	.99
1936-37	143	34%	1.44	101	49%	.64
1938-39	170	24%	2.06	109	60%	.92
1939-40	190	12%	2.38	116	42%	.97
Average	167	24%	1.90	106	56%	.77
1940-41*						
Group 1	54	7%	.68			
Group 2				44	5%	.49
Group 3				33	13%	.24

*November 6, 1940, to January 29, 1941—12 weeks. Group 1 birds were run on new isolated clover range. Group 2 birds were run on range used during previous years, but free of poultry from October to April. Group 3 pullets were raised on range adjoining that used by hens.

ing the old range. The two ranges were fenced separately. This procedure last year was the beginning of a plan which provides that pullets are to be raised each year on a different clover range in a regular three-year crop rotation.

Results of the first year of this plan are remarkable. Pullets that were raised on the new clover range (Group 1 in the table) yielded 19 cents a bird more over cost of feed and loss of pullets during the first 12 weeks as layers than did the Group 2 birds, raised on bluegrass range used for growing pullets year after year, but with no chickens on it from October to April each year. If you run 200 pullets to the acre, this means that a clover field gives returns (through ready-to-lay pullets) of $38 an acre more than the old range pullets.

Comparing these birds with another group (Group 3 in the table), the clover field yielded 44 cents more per bird ($88 an acre) by way of high-quality, ready-to-lay pullets during their first 12 weeks of laying than did the Group 3 pullets which were raised nearby older birds. These Group 3 birds were started and brooded in one end of a hen house, and when 12 weeks old were transferred to range shelters on comparatively clean fresh range adjoining hen range (a condition that prevails on many farms).

This is a good place to point out, too, that the succulent green pasture in a clover field enables a flock-owner to omit some of the more expensive feed ingredients which are used as substitutes for green feed.

What About Ryegrass?

Condensed from Pennsylvania Farmer

J. B. R. Dickey

FOR years scientists have talked and written about the need for winter cover to prevent washing of bare fields. They have stressed the need for more organic matter to improve the fertility of the soil and to absorb rainfall quickly and hold it for crop use. With the exception of some truckers and fruit growers, whose lack of manure and crop rotation made something of the sort doubly essential, the use of cover crops has been comparatively rare. Most legumes suggested were too uncertain and the seed too expensive to appeal to the general farmer. Many had drawbacks, such as lack of winter hardiness with crimson clover, and inconvenient growth habits as with sweet clover.

It has been shown time and again that grass sods, which fill the soil with a mass of fibrous roots, were the most efficient and almost the only practical and really important source of organic matter within the reach of the farmer. Good sods, at frequent intervals in the rotation, have been the secret of the success of the northeastern farmer in maintaining fertility and preventing destructive erosion through a century or more of tillage on sloping fields. It is only in the last few years that it occurred to most that a grass could be successfully used as a cover crop. True, a legume would add to the soil nitrogen, but we cannot have everything, and a good grass cover will greatly reduce the loss of nitrogen, as well as other plant food, through leaching. Grass usually makes better cover and more roots than a legume.

Domestic or Oregon ryegrass has been known for years. Thousands of acres are harvested for seed yearly in the Northwest, and the seed acreage can be greatly expanded. In the past its principal use has been as a rather short-lived "nurse grass" in lawn seedings and as temporary winter pasture in the South. Our experience with it as a cover crop in Pennsylvania now covers three to four years. In 1938 Pennsylvania seedsmen reported selling only small amounts, in 1939 sales jumped to 100,000 pounds, while in 1940 they increased to approximately 500,000 pounds, or enough to sow 25,000 acres. This rapid increase is good evidence that ryegrass has proved satisfactory.

One of the biggest things in its

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favor is the low cost of seed. Wholesale prices are generally around five or six cents per pound, or a little over a dollar per acre for a seeding of 20 pounds. Judging from reports from the Northwest, higher prices need not often be expected, and as the use of this grass becomes more general and extensive the retailer, handling it in the original 100-pound bags, will not need as much margin as when he sold it only in small lots.

The nature of ryegrass is to make most of its growth in cool, moist weather. When sown at the last working of corn in midsummer it usually makes little showing until September. Thus it does not compete with the corn. When the cool, moist, fall days come ryegrass starts to go places and by freezing weather has generally covered the ground with a bright green blanket. Growth starts again early in the spring, and, if undisturbed, the grass will go to seed in June at a height of one to two feet.

There are two general types of ryegrass: the Italian which is somewhat larger, coarser and more rapid in growth, but which tends to be an annual or winter annual; and the perennial or English type which is smaller, darker green and somewhat longer-lived. Most Oregon seed is a mixture of the two types. This is an advantage, since the perennial seems more winter hardy but does not make as large growth. Pure perennial seed is sometimes used in pasture and lawn mixtures and is much more expensive, most of it having been imported.

When sown in the spring ryegrass grows rapidly and will go to seed the year sown, after which much of the Italian type tends to die. If sown before midsummer, or even later on very fertile soil, it may still shoot heads and partially die, or it may make such a heavy mat of growth as to smother itself out over winter. Even so, one has a lot of tops and root for soil improvement and erosion prevention. When sown at the best time, July or August, ryegrass occasionally winter kills but this seems relatively rare. Some of this winter injury may be due to a fungus known as "Snow mold" which develops when snow lies late in the spring. Cover crops of ryegrass have generally come through the winter successfully all over the state.

The finest thing about ryegrass is its root system. Roots are so well distributed through the soil that one cannot have too many of them as a source of organic matter. Too much top plowed down may be a source of trouble in various ways, as when a tall growth of rye is turned under late. A good rye grass cover turns over in the spring like a real sod. It makes, in the same length of time, several times the root

growth of rye and the top never gets too tall and woody. It takes more power to plow ryegrass than bare ground, but most farmers are convinced it is worth it. By sowing ryegrass in the corn a farmer, in a sense, puts two sods into his rotation instead of one. This will be especially desirable where one must grow two crops of corn in succession. If the farmer wished to grow potatoes after corn, as some do to reduce damage from grubs and wire worms, a ryegrass cover in the corn would make conditions more like putting potatoes on sod, with no added risk of worms.

Whether one can expect actual increases in yield of the next crop where ryegrass is plowed down may depend on whether it it turned under before the soil gets too dry, and on adequate moisture after plowing. We have our eye on several places this summer where ryegrass was turned under on only part of the field. All the reports so far received have been favorable and certainly the long-time effect on the soil of having ryegrass at every good opportunity should be beneficial.

Some uneasiness has been felt over the chances of ryegrass becoming a weed. The seed and head, to a certain extent, resemble quack grass, but there the resemblance ends. Ryegrass has a simple, fibrous root system like timothy and if completely covered in plowing it will never come up. If let go to seed there will of course be plenty of volunteer plants, but they would be no worse than other summer grasses except perhaps in vegetable crops such as carrots or spinach. There also seems little danger of getting bad weeds in ryegrass seed.

The biggest general place for a cover crop is in corn where the stubble cannot be got into winter grain. If the field is to be fall-plowed there is less reason for trying to get it covered, though considerable organic matter might still be added through the fall growth. Some worry has been expressed regarding plowing a grass sod for oats, but no trouble need be expected if turned in good time. Twenty pounds is the usual seeding, though less may serve. The last normal working seems a much better time to sow than later. A cyclone seeder handles the seed satisfactorily and will cover three to five middles. A seeder box might be rigged on the cultivator, especially if a tractor is used. Most seeding is done ahead of the cultivator. If the shovels are set shallow, as they should be for late working, the seed will not be covered too deep. Some sow after cultivating and depend on rain for covering, while some sow half the seed before and half after cultivation.

Truckers have largely changed over from rye to ryegrass and are

enthusiastic over the results. The seed may be sown in cabbage and such crops at the last working; sown over tomatoes, squash, etc., without covering or broadcast and harrowed in lightly after early harvested crops. It makes splendid cover after early potatoes. In the Philadelphia area where falls are late, ryegrass sown as late as October 1st has made pretty good cover. Thirty or forty pounds of seed are often used on truck land and for late sowing. Rye is still the standby in most sections after mid-September.

Ryegrass on some farms has found additional use as fall and spring pasture for stock. It is very palatable and nutritious and may furnish a lot of good grazing and still have some fertility value. It seems to be better than rye for this purpose. Some have pastured it most of the summer and then turned it over for wheat instead of growing the usual crop of oats. It made good grazing until midsummer when the hot, dry weather reduced its growth. Another possibility has been a hay crop similar in size and feeding value to timothy or a crop of seed harvested with a combine. Even at five cents per pound, the 400 pounds of seed per acre one might expect on good soil would be worth almost as much as an average oats crop and would be unbeatable for economy of production.

Some have the idea that since ryegrass is good and low in price it could be substituted for timothy and sown on spring or winter grain. Such seedings would probably grow so well that they would smother out the clovers which should be sown. The ryegrass might even compete seriously with the grain crop and would be disappointing as hay. Cases are favorably reported where ryegrass was sown and disked in lightly on oats or wheat stubble when the spring seeding had completely failed. If the field had to go into something else next year this might be advisable, but ryegrass should not take the place of clover and timothy in the regular rotation.

Preservation of Grass Silage by New Methods

Condensed from Certified Milk

W. E. Krauss, Ph.D.

Dairy Department, Ohio Agricultural Experiment Station, Wooster, Ohio

THE practice of making grass silage is now so well known that it is needless to review the procedures generally recommended other than to mention that two preservatives are commonly used, phosphoric acid and molasses, the amount used depending upon the kind of crop. These treatments are intended to prevent unfavorable bacterial activity by (1) reducing activity to a minimum; (2) increasing the rate and degree of fermentation by providing adequate carbohydrate material.

The use of phosphoric acid has, of course, been an outcrop of the A.I.V. procedure which employed a combination of hydrochloric and sulfuric acids in such a manner as to obtain excellent preservation of carotene and other important nutrients.

The molasses development is based on the supposition that because legumes contain less sugar than grasses and corn, and since early experiences with ensiling legumes had not been too successful, readily fermentable carbohydrate material was the limiting factor.

As a rule corn silage naturally develops an acidity ranging between pH 3.5 and 4.0. This pH range, therefore, has been established as the desirable one for grass silage.

That good grass silage can be made when molasses or phosphoric acid is used has been repeatedly demonstrated. Whenever a preservative of this type is used additional expense and inconvenience are involved. It would be highly desirable therefore to be able to make grass silage by using as a preservative some material usually available on the farm or by using no preservative at all.

In cheese producing areas like Wisconsin, cheese-factory whey has been tried with some success. Such a material furnishes lactic acid which might assist in developing a desirable fermentation.

Based upon a trial made many years ago, corn meal or corn-and-cob meal are now being added to green material as it goes into the

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silo. Presumably this is done because of the carbohydrate content of corn but actually the dry matter furnished by the corn or corn-and-cob meal may be the important thing. If 200 pounds of ground corn are added to a ton of green material containing 20 per cent dry matter, the resulting mixture will contain 29 per cent dry matter.

That the dry matter content of green material to be ensiled is important has been demonstrated repeatedly with more than 50 silo fillings at the Ohio Experiment Station, in which various crops have been ensiled without treatment and compared with the same crop to which one of the common preserving materials had been added. With but one or two exceptions the quality of the untreated material has been equal to that of the preserved silage and, when the dry matter content was right, the silages were equally palatable.

What is the right dry matter content? Based upon a series of experiments with special pressure devices, the satisfactory range of dry matter between which good silage can be made without a preservative and without undue loss of juice is 25 to 40 per cent.

When crops containing less than 20 per cent dry matter are ensiled a heavy loss of juice will occur. Between 20 and 25 per cent dry matter, leakage will occur from the lower half of the silo. Between 25 to 30 per cent dry matter there is little leakage except near the bottom of deeper silos. Above 30 per cent dry matter loss of juice will be nil. Loss of nutrients in the juice may be as important as the obnoxious environment created by the leaking silo. However, some solids are lost, along with the grass juice factor.

Weather conditions and kind of crop influence the amount of moisture in crops at any given time. In order to help determine when a crop is suitable for ensiling the following generalization, taken from Ohio Experiment Station Bi-monthly Bulletin No. 208, are offered:

"Hay crop silage-making has gained most popularity as a means of handling early cuttings of alfalfa and clover which it seems necessary to harvest but which cannot be satisfactorily made into hay because of excessive rain and the lack of good drying weather. Under such conditions, most crops are too low in dry matter for best results in silage making. Often, however, sufficient drying weather will be available to raise the dry matter of the mowed crop enough for silage making purposes even though the crop cannot be satisfactorily finished as hay. It should be remembered, however, that a half-day or more of drying at such a time may be required to accomplish as much drying as

would occur in one hour of hot midsummer day.

"When the weather permits no drying at all, another method is available which should prove practical in many cases. One hundred pounds of dry hay, stover, or straw introduced into the cutter along with each ton of the green crop will raise the dry matter content of the mixture by approximately 3½ per cent. Three hundred pounds of such material added in this way would convert a crop of 16 to 18 per cent dry matter to a mixture having nearly 30 per cent, a very desirable level. Material so added must be fed through the cutter simultaneously with the wet crop to form an intimate mixture. Sandwich-style addition of the dry material would certainly be less satisfactory. Ground grains, such as corn or oats, can be used in the same way to increase the dry matter content and at the same time provide a source of carbohydrate material which is often assumed to be necessary for the proper preservation of silage.

"First-cutting hay crops which have passed the 50 per cent bloom stage and later cuttings of clover or alfalfa generally have a considerably higher percentage of dry matter than the early season crops already discussed. Frequently such standing crops have about 25 per cent of dry matter. Drying conditions for such crops average much better than those occurring at the earlier date. Sufficient drying may often be accomplished during the normal interval between mowing and ensiling, or in any event the necessary drying interval will probably be greatly shortened. It is not necessary under these conditions to add additional dry material.

"Overmature crops and crops which are harvested in hot weather should be ensiled as promptly as possible. Fine chopping, although more difficult to accomplish than with wetter crops, is especially needed for crops which are inclined to be over mature or a little too dry, since fine chopping is a great aid to close packing and poor packing is one of the chief causes of bad results in making silage from overday crops. If possible, a silo filled with material which is inclined to be too dry should be topped with green or wet material."

The suggestion that good grass silage can be made without a preservative when the dry matter content of the ingoing crop is right raises many new questions regarding the reactions that occur in silage making. This, plus the many ramifications of the rapidly spreading practice of grass silage making, including the effect of this material on silos and vice versa, has stimulated the inauguration on a new silage project at the Ohio Experiment Station. This project is set up in such a way that by de-

partmental co-operation the chemical, physical, microbiological, biological, engineering and economic phases of grass silage making will be studied, as well as the animal husbandry significance as measured by feeding trials with dairy cattle, beef cattle, and sheep.

Twenty-four specially built silos, 4 feet in diameter and 7 feet high, will be used for obtaining fundamental information on silage making. Six of these silos are tile, six are steel, six are wood, and six are concrete stave. As satisfactory recipes are devised they will be tried on larger silos.

This year all of the silos will be filled with first-cutting alfalfa. No preservative will be used, but dry matter will be varied by wilting in the field. It is felt that such a procedure will yield basic information around which future work can be built.

A New Mastitis Treatment

Researchers in England believe they have a new and effective treatment for dairy cow mastitis (garget).

The new treatment consists of first milking out the affected quarter and replacing the milk with several hundred cc's of a solution of gramacidin, a by-product of germ culturing, or neutral acriflavine, a coal tar dye. The solution is run in under mild pressure thru a special teat tube and allowed to remain for several hours. This is repeated in due time if cultures of the milk still yield streps.

In this country, Rockfeller Institute workers treated 53 quarters on 23 gargety cows with either gramacidine, novoxil, or acriflavine solutions. The treatment destroyed the streps in 34 quarters. This means an efficiency of 65 percent.

Time is needed really to test the merits of this new method under field conditions, but if it works out well, this new boon to the dairy industry will save millions of dollars annually.

—*Successful Farming*

Make Them Eat More Grain—and Like It!

Condensed from Turkey World

E. I. Robertson
State College of Washington

EXPERIMENTAL work on turkey feeding has been a major project at the Washington Agricultural Experiment Station since 1937. During this time, considerable information has been obtained on the efficiency of different methods of feeding. A comparison of these results indicates that the proportion of mash and grain consumed by the birds has a considerable influence on the feed cost of producing a pound of turkey.

The methods of feeding turkeys have, in general, been adopted from methods in widest use with chickens. Since turkey production at its present volume is a much younger industry, it is only natural that the mash and grain system of feeding should be the most popular. However, in the last few years, the free choice feeding of whole grains with a high protein mash or "concentrate" has received attention. For the past two years, some of the Broad Breasted Bronze turkeys produced at the Washington Agricultural Experiment Station have been fed a concentrate and whole grains.

In earlier work from this station, the turkeys were fed a starting mash containing 22.7 percent of high quality protein until they were eight weeks old, after which they were fed a developing mash containing 20.5 percent protein and hopper-fed a mixture of whole grains. In this method of feeding, the turkeys consumed an average of from 93 to 95 pounds of feed to 28 weeks of age. The consumption of the grain mixture was from 43 to 45 pounds per turkey which amounted to an average of 46 percent of their total feed. Whether the developing mash was in mash or pellet form did not appear to influence the consumption of grain.

A year later, a comparison was made of hopper feeding against hand feeding grain to turkeys from 6 to 20 weeks of age. As a control, one group of turkeys was fed no grain. The hopper fed turkeys ate 21 percent of their feed as whole grains, as compared to 19 percent when it was hand fed. There was no appreciable difference in body weight in either group or in the group fed

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no grain. However, in the cost of feed there was a marked difference. The feed cost per turkey was lower with the increase in grain consumption, the highest in the group fed no grain, and lowest in the group which was hopper fed grain.

These turkeys were distributed into six lots and fed six different finishing rations from 20 to 28 weeks of age. During this period they had a choice of pellets containing 16 percent protein and a whole grain mixture composed of different proportions of corn, oats, wheat, and barley. The six groups of turkeys consumed from 42 to 49 percent of their feed as grain during this eight-week finishing period. Previously, when turkeys were fed a developing mash containing 20 percent protein they had consumed from 62 to 68 percent of their total feed as grain between 20 and 28 weeks of age. Since turkeys usually consume as much feed in the two months prior to marketing as they do in the previous four or five months, it is necessary to watch the cost of feed very carefully during this period. In these results, reducing the protein in the finishing feed caused the turkeys to eat less grain.

In 1939, a group of Broad Breasted Bronze poults eight weeks old was divided at random into two groups, separated according to sex, and placed on an alfalfa range. One group of toms and one group of hens were hopper fed a concentrate containing 39 percent protein and a choice of four whole grains, corn, wheat, oats, and barley. The other group of toms and hens were fed a developing mash containing 20 percent protein with a whole grain mixture composed of 40 percent wheat and 20 percent each of corn, oats and barley.

When the turkeys were 28 weeks of age, the greatest growth, most efficient use of feed, and the lowest feed cost per pound of turkey, had been obtained from the high protein concentrate and whole grains. The toms were about 2 pounds heavier and the hens 1 pound heavier than the birds fed the developing mash and grain mixture. The turkeys fed concentrate required 3.8 pounds of feed for the toms and 4.4 pounds of feed for the hens to produce a pound of gain as compared to 4.8 and 4.9 pounds for the toms and hens fed developing mash. The feed cost per pound of live turkeys was 6.7 and 7.2 cents for the toms and hens fed concentrate, whereas it was 8.4 cents for those receiving developing mash.

In comparing the feed consumption, it was found that the toms had 74 percent and the hens 83 percent of their feed as whole grains from 8 to 28 weeks of age when they were fed concentrate. In the turkeys fed developing

mash, the toms ate 47 percent and the hens 48 percent of their feed as grain during the same period. Wheat was the preferred grain for the turkeys fed concentrate. The toms consumed 45 and the hens 55 percent of their total feed as wheat, corn was second with 20 percent, oats third with 8 percent, and very little barley was consumed. The consumption of corn increased somewhat with the approach of cold weather.

Results quite similar to the above have been reported from Michigan State College, where the investigators have reported a higher consumption of oats than any other grain between the ages of eight and twenty-four weeks.

The turkeys consumed a ration very high in protein when they were changed to the concentrate from the starting mash at eight weeks of age. It was believed that equally good results could be secured with a lower consumption of protein which would reduce the cost still further. In order to determine this, four groups of turkeys in 1940 were fed concentrate and whole wheat and oats at four weeks of age, supplemented with a good alfalfa range. The change from the starting mash was made abruptly at four weeks of age. At twenty-four weeks of age the poults had consumed from 68 to 74 percent of all their feed as whole grains. Wheat constituted from 49 to 58 percent, oats from 14 to 22 percent of the total. This increase in the consumption of oats is attributed to starting the whole grains from four weeks instead of from eight weeks of age. At four weeks, the poults appear to take more readily to whole grains, and between four and eight weeks they were able to select a ration containing about 25 percent protein from the wheat, oats, and a concentrate containing 39 percent protein.

Since these results were secured when the turkeys were on range and, therefore, supplemented their ration with young green alfalfa, two other groups of turkeys were grown in confinement to eliminate the effect of green feed Both groups were fed starting mash to five weeks of age when group 1 was changed to concentrate, wheat and oats. At eight weeks of age, group 2 was changed to a developing mash supplemented with wheat and oats. At twenty-four weeks of age group 2 had consumed an average of 72.6 pounds of feed for which 24.6 pounds were wheat and oats, or 34 percent of their ration as whole grains. Group 1 consumed 73.3 pounds of feed of which 42.5 pounds were grain, or 58 percent of their ration. The concentrate fed birds were almost one pound heavier than those fed a developing mash. It is possible, however, that still a greater difference might have resulted had the concentrate contained a higher level of riboflavin

since the turkeys ate but very little of it during the latter part of the growing period.

Four groups of turkeys were raised in confinement and fed other rations until they were eight weeks old. From eight to twenty-four weeks, they consumed an average of 59.2 pounds of feed of which 35 percent was concentrate, 55 percent wheat and 10 percent oats. Similarly, five groups of turkeys in confinement were changed to developing mash, wheat and oats at eight weeks and from then until twenty-four weeks they consumed an average of 63.4 pounds of feed of which 66 percent was mash, 26 percent was wheat and 8 percent was oats. During this time, the concentrate fed birds gained an average of 15.4 pounds and those fed developing mash only 14.9 pounds.

As a result of these investigations, it appears that turkeys will consume large quantities of grain when they are provided the opportunity. The turkeys did not appear to be easily fooled regarding their protein requirements and when a low protein mash was fed they ate more of it and less grain, whereas with a high protein mash they will eat more grain and less mash. If whole grains are produced on the farm or locally, this system offers an opportunity for reducing the production cost of turkeys. When supplemented with a good alfalfa range, this change can be made early in the poults' life and thereby get them in the habit of eating whole grains.

Forestry In Farm Management

R. H. Westveld and Ralph H. Peck

ATTITUDES toward Farm Forestry change. Much of the land on farms that is now cultivated or in pasture originally supported forests. The trees were an obstacle to cultivation so their removal was a prerequisite to agricultural development. However, the forest was allowed to stand on at least a portion of most farms that were developed from timbered land. Gradually these farm forests were cut more or less selectively to supply the owner's (or lessee's) annual needs for fuelwood, logs for lumber, and miscellaneous wood products. These cuttings for home use often were not damaging. The occasional heavier cuttings that yielded timber to sell, often made during years when other farm income was smaller than usual or when extraordinary expenditures were incurred, were generally damaging. They removed the best species and were so heavy that the growing stock or forest capital was seriously reduced. With few exceptions the farm forests were not regarded as permanent assets. Rather, timberland was looked upon as a resource of value only as long as the timber lasted. Often regarded as definitely interfering with the fullest development of the farm for agriculture, the forests gave way ultimately to cultivation. This attitude has been more or less general until recent years. The shrinkage of the export market for many farm products and the changing and improved techniques for producing them have demonstrated that the land still retained in farm forests is not needed for the production of staple agricultural products.

In spite of this general point of view of the land owners, foresters and some agricultural economists have for some time realized that, if the farmer is to succeed, forests must have a permanent place in the agriculture of the United States. Although farm forestry along with other conservation activities did not receive widespread public recognition until about 1934, a definite program for encouraging forestry on farms has been sponsored since 1924 by the Federal Government in co-operation with the states. Some of the states took the initiative in an organized program as early as 1915. Extension programs in forestry are now operating in many states along lines similar to those in animal husbandry, poultry, and other branches of agriculture being di-

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rected by the state agricultural extension services—in most cases in co-operation with the state forest service, and in all cases in co-operation with the United States Department of Agriculture. Some states have expanded their farm-forestry extension programs since 1936 by the use of federal funds for extension work secured under the Bankhead-Jones Act.

Clarke-McNary Act. Sections 4 and 5 of the Clarke-McNary Act of 1924 provided the authority for the Federal Government to engage in a program to assist farmers in solving their forestry problems. The state and federal governments co-operate in this work. Section 4 provides for the production of planting stock for use in establishing windbreaks, shelterbelts, and farm woodlots. Section 5 makes provision for extension work in farm forestry. Appropriations of $100,000.00 annually are allowed for each type of work.

Under the provisions of Section 4 the states, either through their state forest service or state agricultural college, are producing and selling at the cost of production forest-tree planting stock to farm owners for the uses enumerated. This nursery stock cannot be used for any other purpose. Forty-two states were taking advantage of this co-operation in 1939.

Under the provisions of Section 5 the states have been carrying on educational programs in farm forestry, each in charge of one or more extension foresters. In 1925, there were but 24 states engaged in the program, whereas in 1939 there were 40 states and one territory. Although the act authorizes an annual appropriation of $100,000.00 the amounts made available by Congress have, in general, been considerably below that authorized. In 1938 and 1939 the sum of $100,000.00 was appropriated for Section 4, and in 1939 $77,898.00 for Section 5. These were the largest amounts granted for the respective purposes.

Co-operative Farm Forestry Act. In the belief that farm forestry needs were not being adequately provided for under the Clarke-McNary Act Congress passed the Co-operative Farm Forestry Act in 1937. This act allows the Federal Government to engage in a more comprehensive program of co-operation in farm forestry than does the Clarke-McNary Act. It provides not only for the production of planting stock and advice to farmers, but for research and demonstration. The authorized appropriation is $2,500,000.00 annually.

The first appropriation, $300,000.00, was made by Congress in 1939 for the fiscal year 1940. Provision is made to use these funds as follows: $50,000.00 for

the production of planting stock, $50,000.00 for extension, $25,000.00 for research, and $175,000.00 for demonstrations. Although the original act stipulated that the Federal Government could work in a state without the state's co-operation, the appropriation bill stipulates that the Federal Government shall not expend funds in any state unless the state (or other local organization) contributes a sum equal to that allotted by the Federal Government. The work under this act is directed by the Soil Conservation Service in co-operation with the Forest Service and Bureau of Agricultural Economics of the U. S. Department of Agriculture, the state forest services, and agricultural extension services. Each state was called upon to prepare a state program for farm forestry. Preliminary work under these programs was under way in many states early in 1940.

Other Federal and State Aids. In addition to the indirect help that the Federal Government is providing for farm woodland owners, the state and federal governments are furnishing some direct aid. Of these, the benefit payments under the national soil conservation program are at present most significant. Tree planting and improvement of young stands come under this program which has as its objective soil conservation and improvement. The requirements vary somewhat from year to year and by locality. Therefore the details can best be secured from local state or federal representatives before the work is initiated.

Forestry In Farm Management, by R. H. Westveld, and Ralph H. Peck, is an excellent book, showing how the farmer may improve his woodlot, or establish a new one. It shows the reader how much benefit may be derived from properly managed trees. It goes into detail on how various types of wood may be used on the farm, and how special trees may be used for commercial purposes. The protection of trees and how to measure them is also discussed. There is an excellent chapter on how the farm forest aids wild life, and how, if properly managed, it may increase it. The appendix is very complete and includes the names of trees, their habits, requirements and distribution, log rules, financial records, and examples of analyzing data for farm forest plans. In the past few years many farmers have tended to neglect their woodlots. This book will help them to bring the farm woodlot back into full production. **Forestry In Farm Management** is published by John Wiley and Sons. ($3.00)

Hay Exhibits

Condensed from New England Homestead

Paul R. Miller

ONE day in 1933, the Vermont Farm Products Show Committee met to discuss suggestions for improving the show for 1934. One of the suggestions made was to include hay. From the smiles on some faces and the look of doubt on others, it was apparent that including something as commonplace and uninteresting as a jumbled bunch of hay with a display of bright shining apples, snowy white eggs, and glistening jars of amber-colored maple syrup could hardly be called a glamorous addition.

But with fingers crossed, the Committee included hay in the Farm Products family and set about drawing up appropriate classes and score cards for judging. Four classes were decided upon: timothy, alfalfa, timothy and clover, and mixed hay, with provision for three prizes and one ribbon in each class. The rules and regulations were simple—samples were not to be less than five pounds in size and would be judged as dairy hay.

With classes, score cards and rules completed, premium lists were issued and the outcome eagerly awaited. The response was amazing. Forty-one entries, coming from nearly every county of the state, were received, and the interest manifest by visitors at the show was even more amazing. All week long hundreds of visitors stopped and viewed the samples. Some of the more interested felt the hay, some would bury their noses in it to test the odor, while some of the more curious would probe into the bales looking for any variations in quality or admixture of weeds, grain stubble, corn stalks, or other objectionable material.

The interest displayed and comments expressed indicated beyond a question of a doubt that hay was from then on to assume an important place among Vermont's leading farm products at the Show, not because of any particular beauty or glamour that it possessed but because hay is Vermont's leading farm crop. It is a crop to be found on every farm on which livestock is kept and is coming to be more and more regarded as an important part of the livestock ration, particularly with dairy animals which consume large quantities of roughage.

In a recent annual report of

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one of the Vermont DHI Associations, E. H. Loveland, Extension Dairyman, had the following to say about roughage:

"The quality of roughage in this association is very ordinary. This is one reason for the heavier grain feeding. This poor roughage situation is most noticeable during the summer months when very few herds show better quality roughage than that secured in the winter. A comparison of the herds with better roughage, with those with poor roughage, based on tester's estimates of quality, show a marked increase in production in the better roughage herds. This figure is probably based on the general situation in which good feeding efficiency, good cows, and good roughage go together. The comparison is as follows:

	Lbs. Milk	Lbs. Grain
5 good roughage herds..	8252	2364
5 poor roughage herds..	6941	2112
Difference	1317	252

These facts probably explain one of the principal reasons for the increasing interest in the Vermont hay classes and since that first year the number of entries has steadily increased, reaching as high as 80 entries. A very noticeable improvement in quality has also been observed by the judges, particularly with respect to color and leafiness.

At the suggestion of Harold Dwinell, General Manager of the Agricultural Council and the Farm Products Show Committee, score cards, evaluating such factors as leafiness, color and aroma, maturity, foreign matter and texture, were prepared. Each sample is scored on the basis of these factors and the results recorded on a score card which is sent to each exhibitor after the show. This system has done much to improve the quality of the samples from year to year by showing each exhibitor the strong and weak points of his exhibit.

In 1937, thanks to the interest and generosity of the *New England Homestead,* a sweepstakes cup was made available to the Farm Products Show Committee and is awarded annually to the exhibitor having the highest total score in two entries of hay. This cup is retained by the winner for one year, and has done much to increase interest in the hay classes. Winning the hay cup is considered a real achievement.

According to E. O. Pollock, of the Hay, Feed and Seed Division of the U. S. Department of Agriculture, the Vermont hay show has grown to be one of the largest in the country, and during its seven years of existence has effectively fulfilled its purpose of focusing the attention of Vermont farmers on the importance of quality in hay.

New Treatment of Screwworm Infestations

Condensed from The Cattleman

Roy Melvin, C. L. Smith, H. E. Parish and W. L. Barrett, Jr.

Division of Insects Affecting Man and Animals, U. S. Bureau of Antomology and Plant Quarantine

FOR a number of years there has been a great need among owners of large numbers of domestic animals in the screwworm-infested area of the United States for an efficient remedy which combines materials that will kill screwworms infesting wounds and protect susceptible animal tissues against infestation. Previous recommendations by the Department of Agriculture have required the use of one material to kill the maggots in the wound and a second to prevent reinfestation. Where large numbers of animals are to be treated, this method is time-consuming and leads to carelessness which results in failure to kill all the worms.

Research by the Bureau of Entomology and Plant Quarantine during 1940 and 1941 has developed a remedy which, when applied to infested wounds, is efficient in rapidly killing all screwworms in a wound. At the same time this remedy gives as good protection to all wounds against subsequent attack as materials heretofore recommended for this purpose, or even better protection.

The remedy is relatively inexpensive and consists of a correct compounding of the two principal materials at present advocated by the Department of Agriculture for the treatment and prevention of screwworm cases.

Preparation

The remedy known as Formula (or Smear) No. 62 is composed of the following ingredients:

Diphenylamine (technical grade), 3½ parts by weight.

Benzol (commercial), 3½ parts by weight.

Turkey red oil (pH-10 or neutral) 1 part by weight.

Lamp black, 2 parts by weight.

The diphenylamine is dissolved in the benzol, preferably by placing the two substances together and allowing them to stand 12 or 24 hours. In no event should the dissolving of the diphenylamine in benzol be attempted by heating over an open flame. Benzol is highly flammable and should be kept away from flames and lighted cigarettes or cigars. If heat is used to hasten solution, the container holding the benzol and diphenylamine may be placed in a vessel of hot water, the benzol

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container being left uncorked until the diphenylamine is dissolved.

After the diphenylamine is dissolved the turkey red oil is added and the mixture thoroughly shaken. The lamp black is then stirred in gradually and the mixing continued until the compound attains a smooth, even texture of about the consistency of molasses. It is then ready for use.

Use of Remedy on Wounds

The remedy is best applied with a 1-inch paint brush.

In treating an animal infested with screwworms, the material is swabbed into the wound, care being taken that it is pushed well into all the pockets made by the maggots and painted around the wound where blood and wound exudate have made the surrounding tissue attractive to flies and susceptible to infestation or to fly blows.

It is not necessary to remove the dead worms from the wound, but most of the larger dead worms may be picked or wiped out with the brush if desired. If the worms are removed the wound should be treated again with the smear before the animal is released.

For protecting uninfested wounds, such as those caused by shear cut, castrations, dehorning, and docking, it is sufficient to cover the raw tissues and surrounding area thoroughly with a coating of the smear. In treating castration wounds some of the material should be pushed slightly into the openings of both sides of the scrotum.

This remedy kills screwworms quickly, and after its application large numbers of them soon drop out of the wound, carrying a considerable amount of the protective chemical with them. For this reason it is indicated to be a good practice to apply a second treatment from 24 to 48 hours after the first one to insure a proper coating of the wound surface. Thereafter, under average conditions, regular treatments twice each week should be given until the wound is healed. It is especially recommended that infested animals be kept in a hospital pasture when this schedule of treatment is followed. When flies are unusually active and abundant more frequent treatments may be necessary.

This material has been applied to wounds on several hundred sheep, goats, and cattle, and no harmful effects have been observed. Furthermore, in tests in which large doses of the mixture, as well as diphenylamine alone, were applied to sheep and goats, and in which Dr. W. C. Mitchell, of the Bureau of Animal Industry, co-operated, no ill effects whatever were apparent.

This smear will cost approximately $1.50 per gallon, and 1 gallon will treat from 200 to 250 wounds one time.

Precautions in Preparing and Using

1. *Prepare the remedy well away from open flames and do not have lighted cigarettes or cigars around during the process.*

2. Benzol, in the form in which it occurs in the smear, is highly volatile and will evaporate quickly from the smear if left in an open container. *It is therefore advisable that the smear be kept tightly covered in a cool place when not in use.* It is also recommended that only an amount necessary for a few days' use be removed at a time from the larger supply container. Even when animals are actually being treated the container should be kept covered as much as possible. In case the smear, through evaporation, becomes too thick for easy application, an additional amount of benzol may be stirred in to bring it back to its original consistency.

3. When infestations located near the eyes are being treated, care should be taken not to get an excessive amount of the smear into the unaffected parts of the eye. If this is done accidentally it is advisable to wash the eye immediately with plain water, as the material is irritating to the eyes.

4. Do not add oil, grease, or any other substances to the formula, or its efficiency will be greatly impaired, if not entirely destroyed.

Use of Remedy for Fleece Worms

Preliminary tests on sheep infested with fleece worms, or wool maggots, show that Formula No. 62 is efficient in killing these worms and gives a considerable measure of protection against reinfestation.

The material is applied to the affected part and well rubbed into the wool with a brush.

Source of the Material

For the information of those who wish to purchase the ingredients for the mixing of this smear there is given below a list of companies which manufacture them. No claim is made that the list is complete, nor is any guarantee here expressed or implied for the products of the companies listed.

Diphenylamine should be obtainable from the larger wholesale drug companies in screwworm-infested territory. It is manufactured by the following companies:

E. I. Du Pont de Nemours & Company, Inc., Wilmington, Del.

Lederle Laboratories, Inc., 30 Rockefeller Plaza, New York, N. Y.

Eastman Kodak Company, Chemical Sales Division, Rochester, N. Y.

The Dow Chemical Company, Midland, Mich.

Turkey red oil is manufactured by the following companies:

Apex Chemical Co., Inc., 200-

214 So. First St., Elizabethport, N. J.

L. Sonneborn Sons, Inc., 88 Lexington Ave., New York, N. Y.

Lamp black is manufactured by the following companies:

General Carbon Co., Los Angeles, Calif.

The L. Martin Co. (Germantown Eagle or Velvet Brand), Tacony, Pa.

Whittaker, Clark & Daniels, Inc., 260 West Broadway, New York, N. Y.

Straw Poultry House

BALED straw is proving to be a valuable material for the building of temporary laying houses on Missouri farms, says C. E. Rohde, of the University of Missouri College of Agriculture. A ton of baled straw will make about 165 square feet of wall, or serve as the equivalent of 250 board feet of lumber.

Houses of baled straw are made by placing the bales on edge, one tier above another, in the same manner as bricks or concrete blocks are laid. The back and side walls may be built with or without windows, depending on the depth of the house as compared with its width. Light and ventilation may be provided by means of an open front in the south wall. Cracks between bales are packed with loose straw.

A row of posts should be set through the center of the house at 10-foot intervals to support the ridge pole and the upper ends of the rafters. Poles may be used for rafters and other dimension pieces if low-priced native lumber is not available. A plate laid on top of the rear and front walls for attaching the rafters is held in place by long spikes driven into the baled straw. Cross-braces or heavy wires may be used across the rafters to prevent the walls from spreading apart.

It is possible to use straw also for the roof, either piled high on poles laid across the walls or in a thinner layer on a framework of rafters. In either type of construction, old woven wire fencing serves as sheeting across poles or rafters. Rafters should extend about 2 feet beyond the walls, and the straw roof can be improved by capping it with slough grass, cane, or sudan grass.

During the winter months, these baled straw laying houses are warm and dry, and in the summer they are surprisingly cool. Hens lay well in houses of this type, and net profits are greater because of the low cost of construction. Such houses will last for four or five years with little expense for repairs.

—*Missouri Farm News Service*

Improvement of Swine through the Use of Moderate Inbreeding and Selection

Condensed from Hog Breeder

O. S. Willham and J. A. Whatley, Jr.
Oklahoma A. & M. College

FOUR lines of Duroc-Jersey hogs are being developed in a swine breeding experiment at this experiment station. This project was begun in 1937 in co-operation with the Regional Swine Breeding Laboratory of the U. S. Department of Agriculture. The object of this experiment is to establish inbred lines which may be used in crosses with other lines and for top-crossing inbred boars on non-inbred sows. In order to facilitate the fixation of desirable characters within these lines, type and conformation, rate of gain, economy of gain, carcass merit, and productivity of sows are considered in the selection of breeding animals.

Experiments with plants and laboratory animals have indicated the value of inbreeding for "fixing the heredity" within an inbred line. This "fixed heredity" allows the breeder to predict with greater accuracy the offspring to be expected from the mating of certain individuals. Unfortunately, inbreeding is as likely to fix undesired as desired characters. Certain undesired traits are likely to be fixed by inbreeding, especially if the inbreeding is so intense that these traits are fixed before they can be eliminated by selection. Many breeder's experiences with rather close inbreeding have been unfavorable because of the defective traits that have been uncovered. On the other hand, some breeders have used a mild form of inbreeding to increase the uniformity of their herds both in appearance and breeding behavior.

Several studies have been made of the pedigrees of the pure breeds which indicate that the process of pure breeding has resulted in an increase in the inbreeding of purebred animals of about .5 per cent per generation. Thus, pure breeding is a very mild form of inbreeding which is slowly increasing the genetic purity of our purebred animals. In the present experiment the inbreeding will be increased about 6 per cent each generation. This rate of inbreeding is about

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twelve times as intense as that found within the pure breeds. It will be worth while to learn if such a rate of inbreeding can be used with success in swine breeding.

Most of the work in the experiment thus far has been concerned with the establishment and development of the four lines. The general breeding plan in forming these lines is to use two boars and ten sows selected from within each line each generation. Line 1, the highest inbred line, was established a number of years ago in an earlier experiment. The average inbreeding of the litters farrowed in this line last year was 40 per cent. This is slightly higher than the inbreeding that would result from two generations of brother x sister matings. This line has been found to be inferior in most of the desired traits. At the present time it is being tested in crosses with other inbred lines and outbred stock to determine its reaction in these crosses. The average inbreeding of the 1940 litters in the other lines was 16, 11, and 5 per cent for lines 2, 3, and 4, respectively.

One of the features of this experiment is the testing of the rate and economy of gain of four representative pigs from certain litters. All litters tested were self-fed a mixed ration of ground yellow corn and a protein supplement. The protein supplement was composed of 30 per cent meat scraps, 20 per cent fish meal, 25 per cent cottonseed meal, and 25 per cent dehydrated alfalfa leaf meal. The pigs were fed from weaning (56 days) until reaching 225 pounds weight. The protein supplement was decreased in four changes from 30 per cent at the beginning to 12 per cent at the end of the test. One pound of minerals was added to each 100 pounds of feed.

The average daily gain per pig for all litters tested was 1.50 pounds. The fastest gaining litter averaged 1.76 pounds per day, while the slowest gaining litter gained only 1.16 pounds per day. The average feed consumption per 100 pounds of gain was 411 pounds. The range in feed consumption between the least economical and the most economical litters was 113 pounds (473-360). The most economical litter produced 100 pounds of gain at a cost of $4.54, while the feed cost per 100 pounds of gain for the least economical litter was $5.97. This represented a difference in feed cost of $1.43.

Weight at a certain age is a measure of rate of gain which could be used by many practical breeders. In this experiment all hogs are weighed at some age near 180 days. Those not weighed at exactly 180 days are adjusted to this age by the use of a series of correction factors. Differences in the average pig weight of different litters were quite wide even

in the same line. Since the differences in weight at this age are at least partly hereditary, the selection of heavier pigs from the heavier litters should permit some increase in the rate of gain in future generations.

The most desirable market hog is one which hangs up the most desirable carcass. Since direct information on carcass merit is usually not available to the producer, the next best measure of market desirability can be obtained by the study of the conformation of the live animal.

The market type of the animal in this experiment is measured by the scoring of each pig at some weight between 200 and 225 pounds by three or four men. The scores given by these men are then averaged.

One of the characters of great economic importance to the commercial hog producer and one of the easiest characters to measure accurately is the productivity of brood sows. The number of pigs and the weights of the litter at weaning is a satisfactory measure of the ability of the sow to be a profitable producer. The cost of maintaining a sow throughout the year changes very little whether she raises one pig or ten. Therefore, the selection of sows having the ability to wean a large number of heavy pigs could do much toward reducing the cost of pork production. Sows vary quite widely in their ability to raise large litters as can be seen in studying the differences in litters weaned by sows within the same line.

Although the productivity of sows is largely influenced by environmental factors, there is a hereditary tendency for high production. This makes possible an increase in the productivity of a herd by the selection of sows which have a high average production throughout their lifetime and by the selection of sows from high producing families.

The Cow Herd

Condensed from the Shorthorn World

James R. Douglas

THE success of every progressive livestock breeder of today may be attributed, in no small measure, to the degree in which his breeding matrons measure up to current demands relative to type, quality, uniformity and breeding. As a matter of fact, the possession of a herd of high quality, prepotent females creates an invitation to a constant demand for your product, and thus the two become inseparable.

Every herd that is moving along the progressive route, a herd that contains seed stock in demand the country over, invariably possesses a group of cows that meet squarely today's requirements. It is not enough, however, to set our sights upon the singular objective of founding and maintaining a female unit that is commendable in type, quality and character only.

It would be pointless to assemble a group of high quality females and retain that unit intact regardless of the calibre of calves produced. From the standpoint of progressive breeding, a cow is no better than her progeny, providing of course, that the calves have received every opportunity for proper development. No group of cows can logically be considered as an invaluable breeding unit unless they reproduce, with a high degree of consistency, the type of calves currently in demand. Too frequently breeders are reluctant to dispose of cows of superior type that have proven unprofitable breeders. However, there is no place for such animals in a progressive herd.

We are not unmindful of the fact that it is extremely difficult to assemble a uniformly typy group of cows that consistently will produce calves equal or superior to themselves in conformation. Breeders of dairy cattle have found, in their efforts to establish high milk yields, that as they reach a point considerably above the breed average, it becomes increasingly difficult to maintain that level of production in the younger generation—much less to mention increases. Likewise, a similar condition exists in our beef cattle ranks regarding the establishment of herds that will produce high quality progeny with a pronounced degree of consistency.

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Animals decidedly superior in conformation to their immediate ancestors are more likely to produce calves resembling the average of their ancestors than to duplicate their own likeness in this respect. There are some animals that may be introduced successfully into one herd but not in another, undoubtedly because the newly acquired bloodlines exhibited no tendency to "nick" in the latter instance. In other words, the needs of one breeder may, and probably do, vary materially from that of another. However, these are matters which can be determined only by experiment. In order, therefore, to eliminate trial and error in so far as possible, it is highly desirable to select foundation matrons from lines of breeding that have been proven meritorious.

Any prospective buyer can afford to pay a premium price for an individual that is a member of a certain family that is especially prolific and prepotent, a family that has proven itself to breed true to type in one or several herds from generation to generation.

In regard to the feeding and management of the cow herd, the custom of literally forgetting the older stock, once they have matured, is practiced too frequently. In order to obviate early unproductiveness resulting from haphazard feeding and management practices from year to year, it is only a profitable measure to consider the needs of the mature cows with equal intensity to that accorded the young, growing stock.

The adherence to fundamental feeding and management practices will aid materially in maintaining a cow's general health and well being, and thus permit her the longest possible period of productive service in the herd.

In order to select and breed with intelligence, it is essential for breeders to formulate in their minds the qualifications of modern type—that combination of characteristics that fits an animal for a specific purpose.

One of the principal purposes of livestock shows is to familiarize everyone concerned with modern demands relative to market type. To attend these exhibitions as well as to observe the kind of cattle for which packer buyers are paying premiums, is a definite step in the right direction. Those who have made these observations will know that correct type and uniformity are invaluable assets and enhance the sale value of their product.

Andrew Jackson and the Chestnut Mare

Condensed from The Horse

Beverley Rhett

WHEN Andrew Jackson was an old man, a friend was sitting with him in his home, the Hermitage, reviewing the numerous triumphs in the varied career of the great soldier and statesman. And surely few men have faced as great obstacles or have surmounted them more regularly. Had Jackson, the friend asked, ever encountered anything that proved too much for him when he seriously undertook it?

"Nothing that I can remember," was Jackson's reply, "except Haynie's *Maria.* I could not beat her."

Now the saga of Jesse Haynie's marvelous chestnut mare is a tale well worth the telling, but first it might be well to know why Jackson attached so much importance to her victories over him. So the true beginning of the story goes back to the time when Andrew Jackson was a border captain in Tennessee. In those days, as at present, the gentlemen of that section were much given to an interest in the racing of thoroughbreds. The stallion *Truxton* saved Andrew Jackson from serious financial difficulties and laid the foundation for his later comparative prosperity.

When Jackson and *Truxton* first met, luck, in the form of a horse named *Greyhound,* was running all too successfully against both of them; for *Greyhound* not only beat Jackson's *Indian Queen* in straight heats, but ran away from *Truxton,* who had invaded the state from Virginia, bringing with him a promising reputation. Whatever the cost to Jackson was when *Truxton* bowed to *Greyhound,* the cost to his owner, a Major Verell, was so distressing that that gentleman found it necessary to sell the horse. Jackson took him over, assuming the Major's debts to the extent of eleven hundred and seventy dollars, giving three geldings valued at three hundred and thirty dollars, and promising a bonus of two or more geldings should *Truxton* win a purse that fall.

It is likely that this transaction put the adventurous Jackson within the legal jail bounds for debt, but that possibility did not disturb him. In some inexplicable manner he raised five thousand dollars more, and staked the en-

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tire sum on *Truxton* in a return match with *Greyhound,* feeling certain that lack of condition accounted for the Virginian's first defeat.

Jackson's method of training *Truxton,* a task which he immediately undertook personally, was severe. "He worked the horse to the limit of his endurance, but somehow implanted in him a will to win, a circumstance which, as much as anything, epitomizes the character and elucidated the singular attainments of Andrew Jackson."

And win *Truxton* did, not only for Jackson himself, but for many friends, who had staked horses, clothes, and large tracts of land on the outcome. It was one of the great Tennessee races, and it did much to enhance the trainer's reputation as a horseman.

Jackson's reputation was made even brighter by *Truxton's* next victory, for this time it seemed that the horse's owner must certainly have an understanding with his animal deeper than any ordinarily existing between horse and man. *Truxton* had been matched against *Plowboy,* a highly regarded eight-year-old belonging to Capt. Joseph Erwin, of Nashville. On the day appointed for the race *Truxton* was ailing with a badly swollen thigh, a condition seemingly so serious that all Jackson's horse-wise friends recommended withdrawing from the contest. After a final examination of his horse Jackson looked him in the eyes for a moment and then—to the infinite glee of *Plowboy's* supporters—announced that *Truxton* would run. The Erwin contingent's enthusiasm was somewhat dampened by seeing Jackson's big bay win the first heat going away; but when the winner pulled up lame in a foreleg, and with the plate twisted across one of his two remaining good feet, they took heart again, believing it impossible for him to last another heat—much less win it. Yet the second heat was a more decisive triumph than the first; and the fame of *Truxton* spread all over the country, while Jackson took his place which he held for many years among the leading horsemen of the West—the owner of a prominent racing stable built almost entirely on the reputation and winnings of the mighty *Truxton,* his sons and his daughters.

It was five years later that the Jackson racing fortunes began to decline, and as one horse was largely responsible for the General's rise to racing fame, so one horse was the chief cause of his reversals—the chestnut mare *Maria,* owned by Jesse Haynie, of Sumner County. At the Clover Bottom track, built by Jackson and sold to the Nashville Jockey Club, the indomitable general and the unconquerable mare met for the first time in the

autumn of 1811. Jackson was running a *Truxton* colt named *Decatur,* which he considered the most promising prospect in his stable. But *Maria,* then a three-year-old filly, proved too much for *Decatur,* and went on to win five other races against the Jackson colors. This was more than the Jackson pride could take without an attempt at revenge; so the following year the General bought an interest in a horse named *Dungannon,* which he and his co-owner, Ed Bradley, thought capable of lowering the pride of the chestnut mare.

For some time previous to the match between *Dungannon* and *Maria* General Jackson had been expecting orders to march against West Florida, a military project which had long been close to his heart. As a consequence he had paid scant attention to his stable. Or perhaps he felt that he had nothing capable of matching strides with the redoubtable *Maria.* Bradley's *Dungannon* was, however, no more equal to the task than *Decatur* had been; in fact, the mare beat him with more obvious ease.

This defeat rankled so much that Jackson began a nation-wide search for a Thoroughbred that would be able to master the great chestnut mare. Any promising prospect that could be bought he bought. Any one that could not be bought outright he purchased an interest in. And in the case of the De Wett mare he offered his stables and training facilities to a contender in whom he had no other interest than the hope that he could help her humble the formidable *Maria.* Despite these efforts, however, *Maria* ruled the turf for two years without a serious challenge to her supremacy.

Old Hickory's hopes were first pinned on a dappled gray horse named *Pacolet,* which he purchased from Col. William R. Johnson, of Kentucky, telling him to buy "the best 4-mile horse in Virginia, without regard to price."

The Colonel seems, however, to have had some regard to price, for he paid one hundred and seventy-nine dollars for the animal, and passed him on to Jackson for the modest sum of three thousand.

At the 1813 meeting of the Nashville Jockey Club a match which had been arranged between *Pacolet* and *Maria* was called off when the gray's ankle gave trouble, and Jackson paid forfeit of five hundred dollars rather than risk permanent injury to his horse, from whom he still entertained high hopes.

The passing of another year and a close view of the British forces at Mobile did not diminish Old Hickory's interest in his feud with the chestnut mare. From South Carolina he brought a horse named *Tam T'Shanter,* and from Georgia another called *Stump-the-Dealer* to train with

Pacolet. Morever, when an enthusiastic sportsman from Kentucky, a man named De Wett, turned up in Nashville with a challenger of *Maria's* own sex, the General granted him the use of all the fine facilities for training which were afforded by the Hermitage stables. But numbers were of no avail either. *Stump-the-Dealer* was not considered to be up to the race; *Pacolet* was matched against another noted racer named *Doublehead;* and *Maria* romped home in front of *Tam O'Shanter* and the De Wett entry. Even *Pacolet's* triumph over the highly-touted *Doublehead* did not entirely take the sting of repeated defeat out of the General's mind.

So when the autumn meeting of 1815 rolled around the feud was renewed more furiously than ever. First *Maria* faced the De Wett mare in a sprint, emerging victorious over her rival by about ten lengths in a half mile. Then she conquered *Western Light,* another in whom Old Hickory had hopefully purchased an interest. Finally, a match race was arranged in which *Maria* was called upon to give the De Wett entry one hundred and twenty yards' handicap in a two-mile race. And here the hint of a strange tale of magic gets mixed up in the history of the General and the unbeatable chestnut mare.

In Virginia there was a negro jockey named Dick, whose mounts won with such amazing consistency that his fame spread from state to state until it reached the ears of sportsmen in Tennessee. But among the other jockeys, most of whom were negroes, Dick was even better known as a conjuror, a reputation which seems to have played no small part in his success as a rider. Without knowledge of this fact—for no one has ever accused Old Hickory of snide practices on the track or elsewhere—Jackson sent to Virginia for the famed jockey, probably feeling that a clever judge of pace would assure his challenger's victory.

Not since the celebrated race between *Truxton* and *Plowboy* had Tennessee seen anything like the interest which was now displayed in the meeting. People talked of little else, and everyone turned out to witness the historic event. Before the start Berry Williams, who trained the champion, told his jockey to make an early run for the lead. We can imagine his surprise turning to consternation, therefore, as the first half of the test was run without a single move on the part of the chestnut mare's rider. At the end of a mile she was trailing her opponent by one hundred and twenty yards. At the mile and a quarter mark her position was no better. Then, suddenly, the great mare came to life. She settled into a stride that ate up the intervening gap with astounding rapidity.

Almost before the crowd could draw breath to cheer, she caught her rival, flashed past, and won by a margin of one hundred and eighty yards. Even her most ardent admirers were stunned by the seemingly impossible performance. Such blazing speed was incredible, though hardly more so than was the excuse Williams got from his frightened jockey when he demanded to know the reason that his instructions had not been carried out. It seems that Dick had scared the boy with a threat to lift him out of the saddle with a wave of the whip should he let the mare out before a mile and a quarter had been run.

The result of this race made Jackson feel that he could not have a successful racing stable without giving it more of his attention. As that was out of the question, he gradually disposed of all his Thoroughbreds. The gallant *Truxton* sentiment prevented his selling; so Jackson gave him to a friend who took the beautiful bay horse to Mississippi, and the racing stalls at the Hermitage remained vacant.

When Jesse Haynie, flushed with victory, offered to match the matchless *Maria* against any horse in the world at any distance from one to four miles for a purse of five thousand dollars, Old Hickory showed himself to be a gracious loser: "Make it fifty thousand," he said, "and consider me with you. She can beat any horse in God's whole creation."

And perhaps he was right, for *Maria* retired from the turf wars without ever having lowered her colors—even in a single heat.

Wool Grades and Classes

Condensed from the Rural New-Yorker

R. W. Duck

WHILE a record high wool production is anticipated for 1941 higher prices are in prospect. Price increases will be influenced by the fact that mill consumption is now at record high levels. There was a comparatively small carry-over of wool. The present rate of demand for apparel wool is the highest for the past 20 years. Comparative prices of foreign and domestic wools show a narrowing of spread between prices. High freight rates and decreases of available shipping will have a restricting influence on export shipments.

Changing economic conditions have materially influenced specific wool grade requirements, especially as they pertain to certain industrial uses. During the past few years such factors as a decline in demand for woolen underwear, broadcloth and other material requiring a short fine staple have had a detrimental influence on price for short stapled wool. Increased demand for certain kinds of wool for use in automobile upholstery, sport clothes and ladies sport coats have all tended to boost the price for comparatively soft, elastic wool carrying considerable length and strength.

During Colonial days and the later winning of the West a large percentage of our sheep carried a predominance of Merino blood. The market paid a premium for the kind of fleece produced by the fine-wool Merinos. Broadcloth was in great demand and the Merino fleece produced the best. During the early part of the 19th century over 20,000 Merino sheep were imported to the United States. It became customary for wool helpers to grade fleece on the basis of best quality Merino wool, as it was the finest and sold for the most money. Fleeces so graded were usually called Fine.

From this developed our so-called American Blood Grading system. These grades later were based on seven standards (now superseded), which became officially effective by the U. S. Department of Agriculture on July 1, 1923. For the purpose of grading wool the fleece was designated by the grade of the largest pro-

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portion of the fibers of the fleece. All grading was comparative with standards based on a series of samples in the custody of the U. S. Department of Agriculture in the District of Columbia in a container marked "Original official wool standards of the United States, grades."

The seven grades so designated were called: Fine, ½ Blood, ⅜ Blood, ¼ Blood, Low ¼ Blood, Common, and Braid. Such a designation was misleading in its terminology and incorrect in its implications. The Down or Mutton Breeds or grade sheep carrying a predominance of such breeding usually classified as ⅜ or ¼ Blood. They carried no Merino blood, yet many believed and some are still of the opinion that a ¼ blood fleece to so classify must be from a sheep which carries ¼ or more of Merino blood. South-down fleece will almost always grade as ⅜ Blood (56's). Longwool breeds such as Lincolns, Leicesters and Cotswolds produce common and braid wools, sometimes called lustre fleece. Some of the low ¼ Bloods (46's) come from the Longwools or from coarser type grades or frequently Oxfords. It is no discredit, far from it, for a sheep to produce a low ¼ blood wool or common or braid fleece, because in many markets today such wool if clean, bright and of good quality will outsell fine-wool fleeces. The Fine-wool breeds such as Merinos, Rambouillets, and Delaines will grade as Fine and ½ Blood.

Wool grades are based on comparative fineness (density), condition (strength and cleanliness), and length of fiber. The fiber length within a given grade will constitute the primary basis for classification relative to its utilization. Such classes are called Clothing and Combing wools. Combing wools are also referred to as Staple wools. The first process in manufacturing woolen cloth is called carding and combing. When the fibers so obtained are not over 1¾ inches in length the fleece, if of suitable quality, is graded as Clothing. There are two sub-classes of Combing wool, called French Combing and Strictly Combing. French Combing is from wools 1¾ to 2½ inches long, and Strictly Combing wool has a length over 2½ inches.

After wool leaves the carding machines it undergoes a combing process during which the fibers are combed and arranged in a parallel position. This results in some short fibers being combed out, called Noils. They do not have the value of the remaining wool, and are produced in excessive quantity when shearing is improperly done and second cuts are made. The remaining combed fibers are called Tops or Top wool.

As a more accurate standard was needed for grading wool,

present official standards were promulgated in 1926. These are based on the English system, using definite spinning counts to determine a given grade. The grade is resignated by the number of hanks of yarn, 560 yards in length, which can be made from one pound of Top wool, when drawn to its finest possible thread. Using this as a unit basis, one pound of Top wool correctly graded as 80's could be spun into 80 hanks of yarn. This resulted in a classification on 12 numerical grades. Compared to former Blood designations they are: 80's 70's, 64's (Fine); 60's, 58's (½ Blood); 56's (⅜ Blood); 50's, 48's (¼ Blood); 46's (Low ¼ Blood); 44's (Common); 40's, 36's (Braid).

The fleece when sheared should be rolled flesh side out, bringing in the ends and sides, after removing sticks, dirt and wet or tag ends. It should be tied with a regular wool paper twine. Using binder twine has resulted in considerable discrimination against some farm fleeces. The fibers from binder twine and jute bags, if the wool is sacked in them, gets into the fleece and contaminates it. These fibers make a weak and unsightly spot in the woolen cloth, and do not take a comparable dye. When considerable numbers of sheep are to be shorn it is more satisfactory to hire a special man or boy to attend to tying. If the shearer is working on a price per head basis he is not interested in making a good roll.

Poor quality fleece and different grades should be packed separate. Special wool bags should be used exclusively when the clip is to be stored. They should be well packed and kept in a dry place. If the fleece is damp or contaminated with tag ends it may cause a bad stain. Such a condition is called sack-burning.

Tests by several investigators have shown it is not desirable to wash sheep prior to shearing. In wool studies by Hammond at the Ohio Station washing sheep did not improve quality of the wool fiber, and did not diminish the cost of scouring at the mill. Washed sheep produced 1.49 pounds less grease wool per head when shorn April 12, and 2.46 pounds less per head when shorn June 1, than did comparable unwashed sheep. Sufficient premium is not paid over unwashed wool to cover the cost of washing and for the loss in weight of the wool.

Research studies by Roberts, University of Edinburgh, relative to cotted fleece indicates the tendency for sheep to produce a cotted (matted) fleece is principally constitutional. The proportion of sheep in a given flock so affected becomes greater with age. Improper and inadequate feeding seem to be the principal contributing causes. Inheritance

with a predisposition to the condition may be of some significance.

Bell's wool studies at the Ohio Station have clarified many misleading conceptions relative to fleece factors. Ohio Station tests show that wrinkly, excessively greasy-fleeced American Merino sheep may, and in their tests actually did, produce fewer wool fibers per square inch of skin area than smooth bodied American Merino sheep.

Competition has been called the life blood of trade. It may also be of considerable value in its influence on a desirable breeding program. However, if fancy and uneconomic points are stressed to the detriment or disregard of utility considerations it will have an adverse effect. Not only has natural wool grease been unduly emphasized at many of our leading sheep shows, but in some instances it has seemed to form the principal basis for placing, especially in the Merino classes. Whether this has been the fault of the judges or exhibitors, or both, the fact remains that artificial greasing and blacking should be, and at leading fairs now is, being sharply discriminated against.

Breed Considerations

Roberts studies for the Woolen and Worsted Industries, British Research Association, relative to Kemp in the fleece of the Welsh Mountain Sheep show that Kemp differs fundamentally from the wool fibers composing the body of the fleece. The important distinction being in the origin and method of growth. A tendency to produce the objectionable short white hairy fibers, called Kemp, seems to be inherited, and breeding sheep with this undesirable characteristic should be culled from the flock. Roberts also refers to Kemp as dark colored stiff fibers. Welsh Mountain Sheep compose about 10 per cent of Great Britain's sheep population, and have a frequent tendency to produce Kempy fleece. Scattered colored fibers throughout a fleece are very objectionable from a manufacturing consideration. Some breeders of black-faced sheep have found it constructive to follow a selective breeding program to assist in eliminating this undesirable fleece factor.

Some have found wool improvement in the black-faced breeds can be accomplished by observing the time required for the lambs to change from their black birth-coat to their secondary wool. The comparative time involved in this physiologic characteristic is apparently indicative of the amount of black fibers which will later appear in the body of the mature fleece. If a time check is made on the lambs relative to this consideration, and only the more rapidly color changing lambs are retained for

later breeding replacements the appearance of black fibers in the fleece may be materially reduced. Fine-wool sheep seldom have any Kemp in their fleece. With any of the breeds selective breeding replacement, based on fineness of fleece has been shown to materially lower the occurence of Kemp.

Wilson of the California Station has demonstrated that a sharp differentiation should be made between medullated fibers in a fleece and Kemp. Kemp is shed in the fleece while the medullated fiber is not. Medullated fibers seem to be more common among the coarser wool breeds, and are found most frequently in the wool around the lower part of the thigh. It is objectionable because it may cause serious difficulties in manufacturing processes. It is partially responsible for wide deviations from the mean diameter of fiber in the fleeces in which it occurs. Ewes or rams with this tendency should not be retained in the breeding flock.

The studies relative to wool characters and their inheritance by Davenport and Ritzman of the New Hampshire Station show among other considerations that there is no significant correlation between crimp and diameter of fiber; but there is a positive correlation between percent of crimp and length of fiber; probably largely due to the fact that other things being equal, the more crimp the more the fiber can be elongated. Close crimp is a desirable characteristic.

New Course in Agriculture Offered to Women

IN England the Women's Land Army has taken over much of the farm work and is carrying on where the farmer left off. In stable and in dairy, behind the wheel of the tractor plow, and in the harvest field, women are rendering a service of inestimable value to the nation.

In America the shortage of farm labor is already becoming a matter of grave concern. Nearly half a million young men have been called by the draft, and it is estimated that, in some sections of the country, one out of every three farm helpers has either gone into the army or into some defense industry. It is therefore possible that within the next few years American girls may be following in the footsteps of their British cousins, and that they may be called upon to perform an important share of our farm work.

In order to meet the steadily increasing demand for well trained women in this field, the School of Horticulture for Women at Ambler, Pennsylvania, is offering a new two-year course in Agriculture. A few agricultural subjects have always been included in the curriculum of the School, but within the past year or two there has been such a marked increase of interest among the students, and such a demand for trained workers, that it seemed wise to offer a complete and comprehensive course devoted entirely to agriculture. The course includes work in the closely allied sciences such as Chemistry, Soils, Entomology, and Farm Biology, as well as intensive courses in Animal Husbandry, Animal Hygiene, Farm Management, Fruit Growing, Vegetable Gardening, Farm Crops, Poultry and Beekeeping. Ample opportunity for practice work is offered to the students, the seventy-five acre farm which is owned by the School serving as a laboratory, and much of the work is planned on the individual project basis.

One of the most attractive features of the farm group at the School of Horticulture is the fine old Pennsylvania Dutch barn, typical of the barns built in the pre-Revolutionary era. With its dignified proportions, its fine stone gable end, and its massive oak beams, it has great architectural charm. The barn houses a fine herd of registered Jersey cows, and during the past year each student who was enrolled in the course in Animal Husbandry has had the privilege of supervising the official production record of one of the cows. Every student has taken her regular turn on the milking squad and has been re-

sponsible for keeping records of milk and butterfat production and feed and labor costs.

The farm projects to be undertaken during the coming year will be those of a well-diversified modern farm, and the students will have practical experience in the care of horses, sheep, beef cattle, hogs and poultry, in addition to their work with the dairy herd and their projects in the orchard and garden.

Many of the students who have, in the past, taken work in agricultural subjects at the School of Horticulture are now successfully managing their own farms. Others have obtained positions as farm managers on private estates or in institutions, and there is a growing demand for well trained women. One graduate has been Farm Superintendent for the past sixteen years at an Industrial School for Girls near Richmond, Virginia, and many similar positions are being held by graduates of the School of Horticulture.

How to Make Grass Silage For Chickens

Thorough tamping and plenty of molasses seems to be the secret of success in the making of grass silage. This is proved by the results of experiences of Gus Walters, of Vineland, pioneer grass silage exponent. Tamp the lawn clippings well as the barrel is being filled. After the barrel is filled with one day's harvest it is thoroughly wet with a mixture of five gallons of molasses and twenty gallons of water. A 200-pound weight is placed on top of a small barrel head resting on top of the clippings in the 500-pound buttermilk barrel. The next day packed clippings from a second barrel are placed on top of the settled clippings in the first barrel and the weight again applied. The third day settled clippings from the third barrel are used to again fill the first barrel.

With the barrel thoroughly filled with well pressed clippings in this manner it is sealed and put away for fermentation and later use. Most failures in the making of grass silage for poultry are undoubtedly due to poor packing. *—F. R. Raymaley, N. J. Farm and Garden*

New Slants on Feeding

Condensed from The Poultry Item

C. E. Lee

COTTONSEED reduces hatchability—It has been shown in the past by various investigators that cottonseed meal might replace part of the animal protein in rations for laying hens. If too much is used there is a pronounced darkening effect, which rapidly reduces the interior quality of the egg in storage.

Information as to the effect of cottonseed meal or cottonseed oil on hatchability has been mixed and fragmentary. There was some evidence to show that a ration containing 6% cottonseed meal hatched normally but on a ration containing 20%, the hatchability was much reduced, while another investigator found that a ration containing 15% cottonseed meal gave a 30% reduction in hatchability with hens on an alfalfa range.

In the January, 1941, issue of "Poultry Science" appeared a report by Dr. R. C. Ringrose, of the South Carolina Station, demonstrating that the addition of crude cottonseed soil to a satisfactory ration for laying hens markedly reduced the hatchability of the eggs produced. Cottonseed oil at a level of 3.6% of the ration reduced hatchability from approximately 80% to less than 30%. Wesson oil and crude soybean oil fed at the same levels and crude peanut oil at a level of 7% did not affect hatchability. The saponifiable (soap-forming) fraction of the crude cottonseed oil contained the factor which did the damage and neither oxidation of the oil nor heating for two hours at 175 degrees centigrade destroyed the factor, nor was there any effect by filtering or by an alkali treatment.

The use of cottonseed meal as a source of protein in poultry mashes is more common in the south than in the north but it can be found even in some mashes made in the north. It is evident that if the addition of cottonseed meal is sufficient to bring any considerable amount of cottonseed oil into the mash that the effect on hatchability will be disastrous.

Milk Scores Again

There seems to be no end to the wonders of milk. Every now and then some investigator in nutrition decides that he has practically the final answer on the nutritional value of milk but,

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within a few months or less, some other investigator discovers a new value. At the annual meeting of the Poultry Science Association held at Cornell University last summer, Dr. T. G. Culton and Dr. H. R. Bird, of the University of Maryland, reported on "The Effect of some Riboflavin ("G") Supplements on Chick Growth and Curled Toe Paralysis." Varying amounts of riboflavin were supplied in the forms of Crystalline riboflavin, dried skimmilk, and dried whey.

Chicks receiving the low riboflavin basal diet supplemented with dried skimmilk grew more rapidly than chicks on the same diet supplemented with an equivalent amount of crystalline riboflavin. Chicks receiving this same low riboflavin diet with dried whey added as a riboflavin supplement grew no better than those receiving an equivalent amount of crystalline riboflavin.

The investigators concluded that the growth-promoting effect of dried whey can be explained on the basis of its riboflavin content but that dried skimmilk exerts a greater growth-promoting effect than can be explained on this basis. Therefore, it is evident that even in a ration which was supposed to be complete except for riboflavin, that *milk furnishes some still unknown factor which improves results.*

In January, 1941, "Poultry Science" appears another report by Coulton and Bird, of Maryland, in reference to: "The Riboflavin Content of Poultry Feedstuffs" and, it is interesting to note that thirteen samples of dried skimmilk, five of dried whey, and ten of dried buttermilk were assayed. The dried buttermilk samples averaged 72% higher in riboflavin than did the dried skimmilk samples but the riboflavin content of the dried whey samples ranged all the way from about 60% of the potency of the dried skimmilk to 144%. This indicates that the riboflavin content of dried whey as determined by Heiman, at Cornell, some years ago (about one and one-half times that of dried skimmilk) is by no means an accurate indication of the potency of dried whey bought on the open market. Apparently there is much greater variability in the riboflavin (vitamin G) content of dried whey than of either dried skimmilk or dried buttermilk.

Another Vitamin Found In Meat

It has been known for some time that thiamin (vitamin B1), riboflavin (vitamin B2 or G), nicotinic acid, and pantothenic acid (the filtrate factor) are found abundantly in meat. Investigators at the University of Wisconsin have now determined that vitamin B6 (pyridoxine) also is abundant in meat.

Most of the vitamins found in meat are unusually plentiful in such internal organs as liver and

kidney but less abundant in the muscular tissue which makes up the most of meat scrap, as it does of meat consumed by humans. Vitamin B6, however, is even higher in the muscular tissue than in the glandular material. It has been found that the muscular tissue in meat compares favorably with yeast as a good source of vitamin B6.

Incidentally, vitamin B6, when deficient, means slow growth and poor appetite in chicks. Extreme deficiency may be shown by convulsions. Yeast, liver, kidney, and cane molasses were known to be good sources previous to the discovery that it was plentiful in all the muscular tissue of meat.

Sulphur Feeding in Coccidiosis

Investigators at the University of Wisconsin have reported a considerable series of experiments dealing with the feeding of sulphur as protection against coccidiosis. There have also been some other reports including those from Kentucky and Louisiana Experiment Stations. It has developed that the real difficulty is to feed enough sulphur to prevent coccidiosis without at the same time causing poor feathering, slow growth, and "sulphur rickets." From a practical standpoint it seems that it is impossible to feed enough sulphur to prevent coccidiosis of the cecal type entirely and under all conditions without very detrimental effect on the chicks.

Recent experiments at the New York State Veterinary College (Cornell) reported by Dr. P. P. Levine, have indicated that sulphur not only will prevent *cecal* coccidiosis but also has a similar effect in protecting against one variety of *intestinal* coccidiosis (Eimeria necatrix). *This is the first time that there has been any definite evidence of a beneficial effect of sulphur on intestinal coccidiosis of any type.*

Dr. Levine recommends that when intestinal coccidiosis of this type has been diagnosed in a flock, flowers of sulphur should be mixed in the mash in proportion of 5% and fed at once to the rest of the flock for a period of not longer than 5 days. Sulphur feeding should be discontinued after that time. During the period that sulphur is fed, every effort should be made either to place the surviving birds in clean sanitary quarters or to thoroughly clean and disinfect the old quarters.

Sulphur is of value only as a preventive and must be fed before the chickens become infected rather than afterward. Furthermore, *sulphur feeding beyond the 5 day period is likely to produce rickets, retarded growth, and poor feathering.*

Some poultrymen have adopted the feeding of special mixtures containing sulphur for one day a week beginning when the chicks are about three weeks of age and

continuing until nine to twelve weeks of age, depending on the experience with coccidiosis on each particular farm. The effect of sulphur feeding seems to last about three days or so following the use of a sulphur diet. In addition to the effect of sulphur on coccidia in the intestines, the sulphur passed into the litter through the droppings, following the feeding of sulphur, also is helpful in preventing the sporulation of coccidial oocysts in the litter.

It is difficult and rather dangerous to feed sulphur in a mash because the sulphur dust is likely to get into the eyes of the chicks eating the mash and stick them shut so it is preferable to have the sulphur-containing feed in pellet form.

New Disease of Chicks

Investigators at the Wisconsin Station have recently given a name to a new vitamin-deficiency disease. This is called "Nutritional Ichthyosis." The symptoms are said to be quite similar to those of the common disease formerly called "Chick Pellagra" which is due to a deficiency of pantothenic acid. This pantothenic acid deficiency was evidenced by sores at the corners of the mouth, on the eyelids, and around the vent. The eyes remained clear and bright but eyelids might be stuck together. Cracks also appeared on the bottoms of the feet.

The new Ichthyosis is very similar but does not respond to treatment by pantothenic acid (the filtrate factor) and so far has been cured only by feeding certain substances derived from liver, kidney, and the feeding of yeast.

The investigators at Wisconsin believe it likely that vitamin H (biotin) is the nutritional substance needed to prevent this new chick disease. However, a trial of substances supposed to be rich in biotin on chicks afflicted with this new disease has given somewhat uncertain results and further work will have to be done before it can be certain that biotin and vitamin H are absolutely the same and just what the relationship to the new chick disease may be under all conditions.

Breeds Differ in Manganese Needs

A great deal of evidence has piled up in the last few years to indicate not only the desirability of having manganese in chick rations to prevent perosis (slipped tendons) but also to have it in laying and breeder rations. Decreased fertility and hatchability and lower egg production have been the result of manganese shortage in laying and breeder rations.

It has been assumed by most investigators that certain amounts of manganese in the ration would give protection to laying hens but the report recently ap-

pearing from the Michigan Station (Golding, Schaible, and Davidson) has shown that there is a decided difference in the requirements of different breeds for manganese.

The studies at Michigan, while more or less in the nature of a preliminary report, indicate that Barred Rocks, at least the strain used at the Michigan Station, were apparently much more sensitive to a lack of manganese than the White Leghorns. This recalls that Gallup and Norris at Cornell have already demonstrated that, although 50 parts per million was necessary to prevent perosis in chicks of the New Hampshire breed, 30 parts per million completely prevented the condition in White Leghorn chicks. It would be interesting to see the Michigan investigators check the requirement of New Hampshire laying hens against their Barred Rocks and White Leghorns, in the next experiment.

Vitamin in Eggs Fixed by Feed

It has been well established that pantothenic acid (the chick anti-dermatosis vitamin or filtrate factor) is probably deserving of the title: "The Universal Vitamin" as it seems to be needed by every living thing, including man. Yeast, liver, grains, rice bran, cane molasses, peanuts, and eggs, are sources.

It probably will be a long time before eggs are sold on the basis of exact vitamin content and the difficulty of exactly controlling the vitamin content offers many problems. Experimental work carried out under the supervision of the writer several years ago indicated that on rations containing a definite amount of vitamin D, eggs were produced having a great variation in vitamin D content. Part of this was due to differences in individual abilities of the hens to assimilate or transfer vitamin D to the eggs and part was unquestionably due to differences in egg production. Birds laying at a very high rate apparently transfer less vitamin D to the eggs, in general, than those laying at a lower rate on the same ration.

There has been little information as to the effect of pantothenic acid in the poultry ration on the pantothenic acid content of eggs produced on this ration. Recently investigators in the Dept. of Chemistry at the University of Texas and the Texas Station carried out an interesting experiment to determine if and to what extent the pantothenic acid content of the diet influences the amount in the eggs produced by hens on that diet.

White Leghorn hens were used in the test, their diet containing, in the case of one group, 1.9 milligrams of pantothenic acid per hundred grams of the ration as compared to .44 milligrams for the deficient diet.

Eggs from each group were

collected and assayed for pantothenic acid. The yolks and the whites of the eggs were assayed separately and it is interesting to note that nearly all of the pantothenic acid was found in the yolk of the egg and not in the white. Eggs from hens maintained since hatching on a diet low in pantothenic acid showed a markedly lower pantothenic acid content. When these birds were put on a ration containing a larger amount of pantothenic acid the content of the eggs produced increased rapidly.

Some day we may be required to certify the vitamin content of our eggs in terms of vitamins A. D. G. pantothenic acid, and other factors but, up to now, it seems that the consumer who is buying eggs will protect himself best against vitamin deficiency by insisting on the purchase of eggs from birds which are given a ration which is scientifically complete and balanced in vitamin and mineral contents as far as modern nutritional knowledge will permit.

Don't spray horses with an oily fly-repellent and expect them to dodge a heat-stroke on hot days. Their skins must be kept open to eliminate body heat. And the brush and currycomb are still good preventives of heat-stroke.

—*Successful Farming*

War on Mastitis

Condensed from American Agriculturist

A FEW years ago, three cow diseases, tuberculosis, abortion and mastitis, threatened the dairy industry. The Tuberculin test has practically eradicated bovine TB, and calfhood vaccination gives promise as a protective means against Bang abortion. That leaves mastitis as the chief villain and now there is hope that this serious disease is on its way out.

Note that we say "hope" because more experimental work needs to be done. But up to date, tests made at Storrs, Connecticut, and at the University of Pennsylvania are definitely encouraging.

It all started at the Connecticut College in 1939. A salve called Novixol was used on an udder abscess with such good results that some experiments were made by rubbing the salve over the entire udder surface of a cow with mastitis. That didn't work but later the ointment was diffused in oil and injected into the udder through the teat canal. The mastitis cleared up as it did on other cows treated. Novixol, incidentally, contains what is called colloidal silver oxide.

Then at the veterinary school at the University of Pennsylvania careful tests were made on 23 cows and the treatment was reported as 80% successful. Some of those that did not respond were treated before the most effective dosage was determined. Now tests are under way on more cows and the results will be watched by every dairyman.

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

Beef Cattle—By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Son, Inc. $4.00.
(See Farmers Digest, November, 1939)

Beekeeping—By Everett Franklin Phillips, Professor of Apiculture, Cornell University. Published by the Macmillan Co. $4.00.
(See Farmers Digest, July, 1940)

Breeding Your Own, or Raising Colts for Pleasure and Profit—By Clarence E. Bosworth. The Derrydale Press ($10.00). A book suitable for the breeders of hunters' and saddle horses.

Conservation in the United States—By Gustafson, Ries, Guise and Hamilton. Comstock Pub. Co. $3.00.
(See Farmers Digest, July, 1940)

Dairy Cattle and Milk Production—By Clarence H. Eckles, B.S.A., D.Sc., late Chief, Div. of Dairy Husbandry, Univ. of Minnesota. Macmillan Company. $3.60.
(See Farmers Digest, February, 1940)

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.
(See Farmers Digest, October, 1939)

Farm Meats—By M. D. Helser, B.S.A., M.S., Prof. Animal Husbandry, Iowa State College. Macmillan Co. $2.90.
(See Farmers Digest, January, 1940)

Farm Records—By John A. Hopkins, Ph.D., Asso. Prof. of Eco., Iowa State Col.; pub. by Collegiate Press. $2.50.
(See Farmers Digest, October, 1940)

Forestry in Farm Management—By R. H. Westveld, and Ralph H. Peck, John Wiley and Sons, Inc. $3.00.
(See Farmers Digest, September 1941)

Fruit Crops—By T. J. Talbert, Prof. of Horticulture, Univ. Mo., and A. E. Murneek, Asst. Prof. Horticulture, Univ. Mo. Lea and Febiger. $3.75.
(See Farmers Digest, June, 1941)

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.
(See Farmers Digest, January, 1941)

Livestock and Poultry Diseases—By W. A. Billings, Asst. Prof. of Vet. Medicine, Univ. of Minnesota. Macmillan Co. $3.50.
(See Farmers Digest, June, 1940)

Livestock Judging Handbook—By Julius E. Nordby, Asst. Prof. Animal Husb., Univ. Idaho, Bu. Animal Industry, 1938, and W. Malcolm Beeson, Ph.D., Asst. Prof. Animal Husb., Univ. Idaho. The Interstate Printers. $2.60.
(See Farmers Digest, February, 1941)

Poultry Husbandry—By Morley A. Jull, Prof. of Poultry Husbandry, Univ. of Maryland. McGraw, Hill & Co. $4.00.
(See Farmers Digest, July, 1939)

Pork Production—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. Macmillan Co. $3.75.
(See Farmers Digest, September, 1939)

Poisonous Plants of the United States—By Walter Conrad Muenscher, Prof. Botany, Cornell. Macmillan Company. $3.50.
(See Farmers Digest, November, 1940)

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Co. $4.00.
(See Farmers Digest, September, 1940)

Soil Conservation—By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Department of Agriculture. McGraw-Hill Book Company, Inc. $6.00.
(See Farmers Digest, December, 1940)

Vegetable Crops—By Homer C. Thompson, Ph.D., Prof. Veg. Crops, Cornell Univ. Pub. McGraw-Hill Book Co. $5.00.
(See Farmers Digest, May, 1940)

The Western Horse—Its Training, Type and Marketing. By John A. Gorman, Asso. Prof. Animal Production, Univ. of Wyoming. The Interstate Printers and Publishers. $1.65.
(See Farmers Digest, March, 1941)

Plant Ecology—By W. B. McDougall, Regional Biologist, Santa Fe, New Mexico. Lea and Febiger. $3.00.

For the convenience of our readers, books listed may be purchased through this Department. Address C. Leavitt Dyer, Farmers Digest, Ambler, Pa.

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The Farmers Digest Announces A Scholarship Prize Contest

The Farmers Digest is offering a one hundred dollar ($100) scholarship to the winner of the contest.

The rules are as follows:

1. The contest is open only to boys who are members of a 4-H Club, and who will graduate from high school by July 1st, 1942.

2. Each contestant must submit an article of not more than 1500 words on some project undertaken by him in his 4-H Club work at some time during the past three years. The article should contain as many facts and figures as possible.

3. The article must be the original work of the contestant. It must be typed, double spaced on regulation typing paper measuring 8½" by 11". Only one side of the paper is to be used.

4. Each story submitted must be read by the county agent under whom the project was carried out and must be signed by him.

5. The 4-H Club Extension Service in Washington, D. C., will judge all articles, and their decision will be final.

6. The Farmers Digest reserves the right to publish any article submitted in the contest.

7. The Farmers Digest will pay one hundred dollars ($100) towards the further education of the author of the winning article. The money will be paid to the educational institution chosen by the winner and will be applied towards his expenses while there.

8. A one-year subscription to the Farmers Digest will be sent to each of the five boys winning honorable mention in the contest.

9. All articles must be postmarked not later than January 1st, 1942, and mailed to the Farmers Digest, Ambler, Pennsylvania.

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